3

BSc

Syllabuses and Regulations
(3-year curriculum)

2012-13

Faculty of Science
The University of Hong Kong

General Information

SCIENCE

General Information

This booklet includes information on:

- ***BSc Degree curriculum and graduation requirements***

- ***List of courses and descriptions***

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

- ***Majors & Minors***

  Details of the Science Majors and Minors available for students.

- ***BSc Degree regulations***

  Rules that cover curriculum requirements, selection of courses, assessment, unsatisfactory progress, advanced credits and degree 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 credits and exemption, etc, can be found in the *Handbook for BSc Students*, which is available on-line at http://www.scifac.hku.hk/ug/current

Updates on BSc Syllabuses and Regulations can be found at http://webapp.science.hku.hk/sr3/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 in 2007 or thereafter are required to complete at least one Science major as your primary major for the award of the BSc degree. In addition to the primary Science major, students may take a second major or a minor in a Science or non-Science discipline. Students should note that some non-Science majors and minors may require students to have achieved a minimum academic result before they are allowed to enroll in them.

2. BSc Graduation Requirements and Honours Classification

(I) Award of a BSc degree *(for students admitted to the first year in 2010-11, 2011-12 and 2012-13 and admitted directly to the second year in 2011-12 and 2012-13 (under 3-year curriculum))*

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

(a) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula#;

(b) Passed not fewer than 180 credits, comprising

i. At least 90 credits of Science courses, of which no less than 60 credits must be gained from advanced Science courses; and
ii. All required courses as prescribed in the major programme of the BSc degree curriculum; and the Faculty elective courses.

UG5 specifies that students have to successfully complete (1) 6 credits in English language enhancement, i.e. CAES1801 Academic English for Science Students and CAES2802 Advanced English for Science Students; (2) 3 credits in Chinese language enhancement, i.e. CSCI0001 Practical Chinese language course for science students; (3) 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry.

(II) Award of a BSc degree *(for students admitted in 2009-10 or before and admitted directly to the second year in 2010-11)*

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

(a) Take 180 credits of courses

(b) Pass 180 credits** of courses of which at least 90 credits must be gained from Science courses, of which no less than 60 credits must be gained from advanced Science courses

(c) Pass

i. ECEN1801/CAES1801 Academic English for Science Students
ii. ECEN2802/CAES2802 Advanced English for Science Students
iii. CSCI0001 Practical Chinese Language Course for Science Students
iv. a 3-credit broadening course in "Humanities and Social Sciences Studies" *^Ω
v. IT proficiency requirement : YITC1002 Information Technology Proficiency Test@Ω
vi. all required courses as prescribed in the major and minor curriculum; and the Faculty Electives #

** *Students are also required to pass a 3-credit broadening course in Culture and Value Studies[Ω] or a 3-credit course in an area outside the BSc curriculum. This requirement will be waived if students have successfully completed a second major or minor in a non-science discipline.*

* *This requirement will be waived if students have successfully completed a second major or a minor in a non-Science discipline.*

^ *Students admitted to the first year in 2009 may take a 6-credit IT-integrated course in Humanities and Social Sciences Studies offered in 2009-2010 or a 6-credit course in the Common Core Curriculum to be offered from 2010-2011 onwards to satisfy this requirement.*

@ *IT proficiency requirement can be satisfied by taking Information technology proficiency test or a 6-credit IT-integrated course in Humanities and Social Sciences Studies.*

\# *Faculty Electives refer to a pass of at least 6 credits from each of the Blocks A, B and C. This requirement is only for students admitted to the first year of the BSc programme in 2007 or thereafter.*

Ω *For students admitted directly to the second year in 2010-11, (a) they are required to take and pass 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry, to fulfill the broadening course ("Humanities and Social Sciences Studies" & "Culture and Value Studies") requirements; and (b) they have been granted a waiver of the IT proficiency requirement.*

For students admitted in 2009-10 (or before), should they not be able to satisfactorily complete the outstanding IT Proficiency Test or broadening courses within 2010-11, Senate has approved that students be required to take Common Core courses in 2011-12 to satisfy outstanding UG3 graduation requirements. They will therefore be required to take an equivalent number of credits in any Area of Inquiry of the Common Core Curriculum to make up for the outstanding credits. Should the IT Proficiency Test or 3 credits for a broadening course be outstanding, this means they will have to overload by 3 credits and take one 6-credit Common Core course to satisfy the requirement.

3. Honours Classification

(I) Honours Classification *(for students admitted to the first year in 2012-13 or thereafter)*

Classification of honours are calculated using the cumulative grade point average (CGPA), with all courses taken (including failed courses, but not including courses approved by the Senate graded as "Pass", "Fail", or "Distinction") carrying equal weighting:

	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.

(II) Honours Classification (for students admitted to the first year in 2010-11, 2011-12 and admitted directly to the second year in 2011-12)

Classification of honours are calculated using the grade point average (GPA) of the best 180 credits taken, including 90 credits of science courses of which 60 credits must be advanced level science courses:

	GPA
First Class Honours	≥ 3.6
Second Class Honours Division I	≥ 2.8
Second Class Honours Division II	≥ 2.1
Third Class Honours	≥ 1.7
Pass	fulfil graduation requirements

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.

(III) Honours Classification (for students admitted to the first year in 2007-08, 2008-09 and 2009-10 and admitted directly to the second year in 2008-09, 2009-10 and 2010-11)

Classification of honours are calculated using the grade point average (GPA) of the best 180 credits taken, including 90 credits of science courses of which 60 credits must be advanced level science courses:

	GPA
First Class Honours	≥ 3.5
Second Class Honours Division I	≥ 2.8
Second Class Honours Division II	≥ 2.1
Third Class Honours	≥ 1.7
Pass	fulfil graduation requirements

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.

Science Course

A Science course is defined as any course offered by the Faculty of Science and the Department of Biochemistry. Specifically, the following courses are classified as Science courses:

Science courses	
Courses	*Course code with a prefix*
Biochemistry	BIOC
Biological Sciences	BIOL
Chemistry	CHEM
Earth Sciences	EASC
Mathematics	MATH
Physics	PHYS
Statistics and Actuarial Science	STAT
Science Faculty	ENVS or SCNC

Advanced Science Course

An advanced Science course means any level 2, 3 and above course offered by the Faculty of Science and the Department of Biochemistry. Specifically, the following courses are classified as advanced Science courses:

Advanced Science courses	
Courses	*Course code with a prefix*
Biochemistry	BIOC2... or BIOC3...
Biological Sciences	BIOL2… or BIOL3…
Chemistry	CHEM2... or CHEM3...
Earth Sciences	EASC2... or EASC3…
Mathematics	MATH2... or MATH3... or MATH6…
Physics	PHYS2... or PHYS3... or PHYS6…
Statistics and Actuarial Science	STAT2… or STAT3… or STAT6…
Science Faculty	ENVS2… or ENVS3… or SCNC2... or SCNC3...

SECTION II

List of BSc Courses on offer in

2012/13 and 2013/14

SCIENCE

SECTION II List of BSc Courses on offer in 2012/13 and 2013/14^

Course Code	Title	Credit	Pre-requisite	Available in 2012-2013	Available in 2013-2014	Semester offered in 2012-2013 (0=year long, 1=1st sem *, 2=2nd sem, S=summer)	Exam held in 2012-2013	Quota	Course Coordinator
Department of Biochemistry									
BIOC1001	Basic biochemistry	6	(E or above in AL Biol or AL/AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have passed in BIOL1125, or have already enrolled in this course.	Y	Y	1	Dec	300	Prof D K Y Shum, Biochemistry
BIOC1003	Introduction to molecular genetics	6	E or above in AL Biol/AL Chem or AS Chem; or Pass in CHEM0004 or CHEM0008	Y	Y	2	May	150	Dr J D Huang, Biochemistry
BIOC2601	Metabolism	6	Pass in BIOC1001 or BIOL1125	Y	Y	1	Dec	60	Dr N S Wong, Biochemistry
BIOC2602	Understanding metabolic diseases	6	(Pass in BIOC1001 or BIOL1125 or BIOL1514); and (Pass in BIOC2601, or already enrolled in this course).	Y	Y	2	May	40	Dr L Y L Cheng, Biochemistry
BIOC2603	Principles of molecular genetics	6	Pass in BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106	Y	Y	1	Dec	60	Dr M H Sham, Biochemistry
BIOC2604	Essential techniques in biochemistry and molecular biology	6	Pass in BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106 or MEDE0001	Y	Y	2	May	60	Dr K M Yao, Biochemistry
BIOC2616	Directed studies in biochemistry	6	This course is for Biochemistry major students only; and Not for students who have passed in BIOC3614, or have already enrolled in this course.	Y	Y	1, 2, S	No exam	45	Dr J D Huang, Biochemistry
BIOC3608	Sequence bioinformatics	6	Pass in BIOC2603 or BIOL2303 or BIOL3308 or MEDE0001	Y	Y	2	May	60	Dr B C W Wong, Biochemistry
BIOC3609	Molecular medicine	6	Pass in BIOC2603 or BIOL2303	Y	Y	2	May	50	Dr D Y Jin, Biochemistry
BIOC3610	Advanced biochemistry I	6	Pass in (BIOC1001 and BIOL2301 and (BIOC2601 or BIOL2115))	Y	Y	1	Dec	50	Dr K M Yao, Biochemistry
BIOC3611	Advanced biochemistry II	6	Pass in BIOC2601 and BIOL2301; and Pass in BIOC3610, or already enrolled in this course.	Y	Y	2	May	50	Dr D Chan, Biochemistry
BIOC3613	Molecular biology of the gene	6	Pass in BIOC2603 or BIOL2303 or BIOL3308	Y	Y	2	May	50	Prof K S E Cheah, Biochemistry
BIOC3614	Biochemistry project	12	Pass in BIOC1001 and BIOC2604; and Pass in BIOC3610, or already enrolled in this course; and Pass in BIOC3611, or already enrolled in this course; and Pass in BIOC3615, or already enrolled in this course; and Not for students who have passed in BIOC2616, or have already enrolled in this course.	Y	Y	0	No exam	15	Dr N S Wong, Biochemistry
BIOC3615	Advanced techniques in biochemistry & molecular biology	6	Pass in (BIOC1001 and (BIOC0002 or BIOC1003) and BIOC2604)	Y	Y	1	Dec	50	Dr D Chan, Biochemistry
BIOC3988	Biochemistry internship	6	Students are expected to have satisfactorily completed the first two years study.	Y	Y	1, 2, S	No exam	10	Dr J D Huang, Biochemistry
School of Biological Sciences									
BIOL0118	Bioethics	6	NIL	N	Y	---	---	40	Prof F C Leung, Biological Sciences
BIOL0126	Fundamentals of biology	6	E or above in HKCEE Biol; and Not for students with E or above in AL Biol; and Not for students who have passed in BIOL1122, or have already enrolled in this course; and Not for students who have passed in any BIOL2XXX level, or have already enrolled in these courses; and Not for students who have passed in any BIOL3XXX level, or have already enrolled in these courses.	Y	Y	1	Dec	189	Dr W Y Lui, Biological Sciences

^ 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
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
School of Biological Sciences (Cont'd)									
BIOL0127	Contemporary nutrition: insights and controversies	3	Not for students who have passed in BIOL1514, or have already enrolled in this course; and Not for students who have passed in BIOL2533, or have already enrolled in this course; and Not for students in Food & Nutritional Science Programme / Major / Minor.	N	N	---	---	50	Dr E T S Li, Biological Sciences
BIOL0135	Introductory microbiology	6	Not for students who have already passed in BIOL0129 before.	Y	Y	1	Dec	80	Dr V Dvornyk, Biological Sciences
BIOL0604	Evolutionary diversity	6	NIL	Y	Y	2	May	60	Prof R M K Saunders, Biological Sciences
BIOL0625	Ecology and evolution	6	NIL	Y	Y	1	Dec	50	Prof D Dudgeon, Biological Sciences
BIOL1120	The gene	6	Not for students with E or above in AL Biol; and Not for students who have already passed in BIOL0120 or YSCN0004 or CCST9011 before.	N	Y	---	---	50	Prof F C Leung, Biological Sciences
BIOL1122	Functional biology	6	E or above in AL Biol; or Pass in BIOL0126, or already enrolled in this course.	Y	N	1, 2	Dec, May	100	Prof W W M Lee, Biological Sciences
BIOL1125	Introduction to biochemistry	6	(E or above in AL Biol or AL Chem or AS Chem; or Pass in BIOL0126 or CHEM0004 or CHEM0008); and Not for Students who have passed in BIOC1001, or have already enrolled in this course.	Y	Y	1	Dec	100	Dr C S C Lo, Biological Sciences
BIOL1133	Biological sciences laboratory course	6	(E or above AL Biol; or Pass in BIOL0126); and Not for students who have already passed in BIOL0128 before; and Not for students who have already passed in BIOL0132 before.	Y	Y	2	No exam	110	Dr W Y Lui, Biological Sciences
BIOL1514	Nutrition and metabolism	6	E or above in AL Biol; or Pass in BIOL0126	Y	N	2	May	150	Dr E T S Li, Biological Sciences
BIOL1528	Food chemistry	6	(E or above in AL or AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have already passed in BIOL1123 before; and Not for students who have already passed in BIOL1513 before.	Y	Y	2	May	110	Dr J C Y Lee, Biological Sciences
BIOL1608	Biostatistics	6	Pass in BIOL0625	Y	Y	1	Dec	60	Dr K M Y Leung, Biological Sciences
BIOL2109	Economic botany	6	Pass in BIOL0126 or BIOL0604 or BIOL1122 or BIOL1528	N	Y	---	---	30	Dr C S C Lo, Biological Sciences
BIOL2111	Molecular microbiology	6	Pass in BIOL0126 or BIOL0129 or BIOL1122	Y	Y	2	May	50	Dr J S H Tsang, Biological Sciences
BIOL2112	Plant physiology	6	Pass in BIOL1121 or BIOL1122 or BIOL0126	Y	Y	1	Dec	100	Dr W K Yip, Biological Sciences
BIOL2115	Cell biology & cell technology	6	Pass in BIOL1121 or BIOL1122 or BIOL0126 or BIOC1001 or BIOL1125	Y	Y	1	Dec	120	Dr A S T Wong, Biological Sciences
BIOL2118	Conservation genetics	6	Pass in BIOL0604 or BIOL1106 or BIOL1122	N	Y	---	---	50	Dr M Sun, Biological Sciences
BIOL2119	Genetics	6	Pass in BIOL1121 or BIOL1122 or BIOL1125 or BIOL0126; and Not for students who have already passed in BIOL2116 or BIOL2117 before.	Y	Y	1	Dec	100	Dr C S C Lo, Biological Sciences
BIOL2203	Reproduction & reproductive biotechnology	6	E or above in AL Biol; or Pass in BIOL0126 or BIOL1107	Y	Y	1	Dec	50	Prof A O L Wong, Biological Sciences
BIOL2205	Immunology	6	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126	Y	Y	2	May	100	Dr B L Lim, Biological Sciences
BIOL2207	Endocrinology: human physiology II	6	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126	N	Y	---	---	90	Prof B K C Chow, Biological Sciences
BIOL2210	Evolution	6	Pass in BIOL0126 or BIOL0604 or BIOL0625 or BIOL1122 or BIOL1106	Y	Y	1	Dec	50	Dr M Sun, Biological Sciences

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
School of Biological Sciences (Cont'd)									
BIOL2215	Animal Physiology & Environmental Adaptation	6	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126	Y	Y	2	May	50	Prof A O L Wong, Biological Sciences
BIOL2218	Human physiology	6	Pass in BIOL1122 or BIOL0126	Y	Y	1	Dec	120	Dr W Y Lui, Biological Sciences
BIOL2301	Protein structure and function	6	Pass in BIOC1001 or BIOL1125 or BIOL1122 or BIOL0126	Y	Y	2	May	150	Dr W K Yip, Biological Sciences
BIOL2302	Fermentation technology	6	Pass in BIOL1122 or BIOL0126 or BIOL1123 or BIOL1528 or BIOL0129 or BIOL0135	N	N	---	---	60	TBC, Biological Sciences
BIOL2303	Molecular biology	6	Pass in BIOL1121 or BIOL1122 or BIOL0126 or BIOL0129 or BIOL0135 or BIOL1125	Y	Y	1, 2	Dec, May	80	Prof B K C Chow, Biological Sciences
BIOL2318	Biological sciences field course	6	Students are expected to have successfully completed their first year. The pre-requisites will vary according to the specific course.	Y	Y	S	No exam	20	Dr L Karczmarksi, Biological Sciences
BIOL2320	Directed studies in biological sciences	6	Pass in at least 18 credits of any BIOLXXXX courses; and Cumulative GPA of 2.7 or above	Y	Y	0	No exam	50	Dr M Sun, Biological Sciences
BIOL2324	Microbial physiology and biochemistry	6	Pass in BIOL0129 or BIOL0135 or BIOL0120 or BIOL1120; and Pass in BIOL2111 or BIOL2303, or already enrolled in either course.	Y	Y	1	Dec	60	Dr A X Yan, Biological Sciences
BIOL2503	Grain production & utilization	6	Pass in BIOL0002 or BIOL1122 or BIOL1528	Y	Y	1	Dec	40	Dr H Corke, Biological Sciences
BIOL2507	Meat and dairy science	6	Pass in BIOL0002 or BIOL1122 or BIOL0126 or BIOL1123 or BIOL1528	Y	Y	2	May	50	Prof N P Shah, Biological Sciences
BIOL2515	Food microbiology	6	Pass in BIOL0002 or BIOL1123 or BIOL1528 or BIOL0129 or BIOL0135	Y	Y	2	May	75	Dr H S El-Nezami, Biological Sciences
BIOL2530	Molecular biology and nutrigenomics	6	Pass in BIOC1001 or BIOL1125 or BIOL1106	Y	Y	1	Dec	80	Dr K C Tan-Un, Biological Sciences
BIOL2532	Diet and disease	6	Pass in BIOL1514	Y	Y	2	May	75	Dr J M F Wan, Biological Sciences
BIOL2533	Nutrition and life cycle	6	Pass in BIOL1514	Y	Y	1	Dec	80	Dr E T S Li, Biological Sciences
BIOL2534	Nutrition and public health	6	Pass in BIOL1514	Y	Y	2	May	110	Dr J M F Wan, Biological Sciences
BIOL2535	Food processing and engineering laboratory course	6	Pass in BIOL0002 or (BIOL1123 and BIOL1513) or BIOL1528	Y	Y	1	Dec	70	Dr J C Y Lee, Biological Sciences
BIOL2536	Food and nutrients analysis laboratory course	6	Pass in BIOC1001 or BIOL1125 or BIOL0128 or BIOL1122 or BIOL0126 or (BIOL1123 and BIOL1513) or BIOL1528	Y	Y	1	Dec	70	Dr M F Wang, Biological Sciences
BIOL2538	Nutraceuticals and functional foods	6	Pass in BIOL1514 and BIOL1528	Y	Y	1	Dec	40	Dr M F Wang, Biological Sciences
BIOL2540	Food and Nutritional Toxicology	6	Pass in BIOL1528 or BIOL1123	Y	Y	2	May	90	Dr H S El-Nezami, Biological Sciences
BIOL2606	Environmental microbiology	6	Pass in BIOL0129 or BIOL0135 or ENVS1002 or BIOL0126	N	Y	---	---	80	Dr J D Gu, Biological Sciences
BIOL2607	Fish biology	6	Pass in BIOL1121 or BIOL0603 or BIOL0625 or BIOL0604 or BIOL0600	Y	Y	2	May	50	Prof Y J Sadovy, Biological Sciences
BIOL2610	Marine biology	6	Pass in BIOL0603 or BIOL0625 or BIOL0604 or BIOL0605 or BIOL0600 or EASC0105 or ENVS1002	Y	Y	2	May	40	Dr M Yasuhara, Biological Sciences
BIOL2611	Systematics & phylogenetics	6	Pass in BIOL1121 or BIOL0604	Y	Y	1	Dec	40	Prof R M K Saunders, Biological Sciences
BIOL2612	Conservation ecology	6	Pass in BIOL1106 or BIOL1121 or BIOL0604 or ENVS1002 or BIOL0126	Y	Y	2	May	40	Prof Y J Sadovy, Biological Sciences
BIOL2614	Environmental toxicology	6	Pass in BIOL2606 or CHEM1007 or CHEM1009 or CHEM2102 or EASC0118 or EASC1122	Y	Y	1	Dec	80	Dr J D Gu, Biological Sciences
BIOL2615	Freshwater ecology	6	Pass in (BIOL0601 or BIOL0600 or BIOL0625) and BIOL0604	Y	Y	1	Dec	40	Prof D Dudgeon, Biological Sciences
BIOL2617	Experimental intertidal ecology	6	Pass in BIOL0126 or BIOL0603 or BIOL0604 or BIOL0625 or BIOL1608 or BIOL2608 or ENVS1002	Y	Y	2	May	40	Prof G A Williams, Biological Sciences

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
School of Biological Sciences (Cont'd)									
BIOL2619	Terrestrial ecology	6	Pass in BIOL0604 or BIOL0605 or BIOL0625 or BIOL0600 or BIOL0603 or ENVS1002	N	Y	---	---	30	TBC, Biological Sciences
BIOL2621	Plant structure & evolution	6	Pass in BIOL0604; and Not for students who have already passed in BIOL2616 before.	Y	Y	2	May	60	Prof R M K Saunders, Biological Sciences
BIOL2622	The biology of marine mammals	6	Pass in BIOL0604 or BIOL0605 or BIOL0600	Y	Y	1	Dec	30	Dr L Karczmarski, Biological Sciences
BIOL2625	Animal behaviour	6	Pass in BIOL0604 or BIOL0625	Y	Y	1	Dec	30	Dr L Karczmarski, Biological Sciences
BIOL3214	General virology	6	Pass in BIOL2303 or BIOL2205 or BIOC2603 or BIOC1003	Y	Y	1	Dec	40	Dr B L Lim, Biological Sciences
BIOL3219	Clinical microbiology and applied immunology	6	Pass in BIOL2205	Y	Y	2	May	80	Dr W Y Lui, Biological Sciences
BIOL3307	Biotechnology industry	6	Pass in BIOL2303 or BIOC2603	N	N	---	---	40	TBC, Biological Sciences
BIOL3315	Animal biotechnology	6	Pass in BIOC2603 or BIOL2303	Y	Y	2	May	80	Dr A S T Wong, Biological Sciences
BIOL3316	Plant biotechnology	6	Pass in BIOC2603 or BIOL2303	Y	Y	1	Dec	80	Prof M L Chye, Biological Sciences
BIOL3317	Microbial biotechnology	6	Pass in BIOC2603 or BIOL2303	Y	Y	2	May	60	Dr J S H Tsang, Biological Sciences
BIOL3321	Biological sciences project	12	Pass in at least 18 credits of BIOL0XXX or BIOL1XXX level courses and 18 credits of BIOL2XXX or BIOL3XXX level courses; and Cumulative GPA of 3.0 or above	Y	Y	0	No exam	30	Prof G A Williams, Biological Sciences
BIOL3325	Molecular phylogenetics and evolution	6	Pass in BIOL2303 or BIOL2116 or BIOL2119 or BIOL2611	N	Y	---	---	25	Dr V Dvornyk, Biological Sciences
BIOL3527	Food safety and quality management	6	Pass in BIOL2515	Y	Y	1	Dec	40	Dr H Corke, Biological Sciences
BIOL3538	Food product development	6	Pass in BIOL2501 or BIOL2535	Y	Y	1	Dec	40	Dr M F Wang, Biological Sciences
BIOL3540	Diet, brain function and behaviour	6	Pass in BIOL1514 and BIOL2533	N	N	---	---	40	Dr E T S Li, Biological Sciences
BIOL3621	Fisheries and mariculture	6	Pass in BIOL2607 or ENVS1002 or BIOL0126	Y	Y	2	May	50	Prof Y J Sadovy, Biological Sciences
BIOL3622	Ecological impact assessment	6	Pass in BIOL0605 or BIOL0600 or ENVS1002	Y	Y	2	May	30	Prof R S S Wu, Biological Sciences
BIOL3626	Conservation in practice	6	BIOL2612 Conservation ecology	N	Y	---	---	30	Professor Y Sadovy, Biological Sciences
BIOL3988	Biological sciences internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Dr T Vengatesen, Biological Sciences
ENVS1002	Environmental life science	6	Nil	Y	Y	1	Dec	40	Dr T Vengatesen, Biological Sciences
ENVS2003	Demographic principles in ecology and evolution	6	Pass in ENVS0001 or BIOL0126 or ENVS1002 or BIOL0625 or BIOL0604 or STAT1301 or MATH1111 or BIOL0605 or ECON1001	Y	Y	1	Dec	60	Dr D L Thomson, Biological Sciences
ENVS2009	Remediation	6	Pass in ENVS0001; and Pass in BIOL2606 or ENVS2008, or already enrolled in either course.	N	Y	---	---	50	Dr J D Gu, Biological Sciences
ENVS2012	Global change ecology	6	Pass in ENVS1002	Y	Y	2	May	50	Dr C Dingle, Biological Sciences
ENVS3013	Ecological demography in changing environments	6	Pass in BIOL1608, BIOL2608 or BIOL2610 or BIOL2611 or BIOL2612 or BIOL2615 or BIOL2617 or BIOL2619 or ENVS2003 or STAT2301 or STAT2801 or ECON2101	N	Y	---	---	60	Dr D L Thomson, Biological Sciences
ENVS3014	Environmental risk assessment and management	6	Pass in BIOL1608 or BIOL2608 or BIOL2614 or CHEM2102 or ENVS2008 or ENVS2009	N	Y	---	---	---	Dr K M Y Leung, Biological Sciences
ENVS3016	Environmental science in practice	6	Satisfactorily completed second year of study in the Environmental Science major	Y	Y	0	No exam	18	Dr M Yasuhara, Biological Sciences
ENVS3988	Environmental science internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	30	Dr C Dingle, Biological Sciences

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
Centre for Applied English Studies									
CAES1801	Academic English for Science Students	3	Not for students who have passed in ECEN1801 before.	Y	Y	1	Dec	---	Mr P D Desloge, English
CAES2802	Advanced English for Science Students	3	Pass in ECEN1801/CAES1801	Y	Y	2	May	---	Mr P D Desloge, English
Department of Chemistry									
CHEM0003	Chemistry and daily life	3	Not for students who have passed in CHEM1002, or have already enrolled in this course; and Not for students who have passed in CHEM1003, or have already enrolled in this course; and Not for students who have already passed in CHEM1005 before; and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1009, or have already enrolled in this course; and Not for students who have passed in CHEM1401, or have already enrolled in this course; and Not for Chemistry major students.	N	N	---	---	200	Prof W K Chan, Chemistry
CHEM0008	Fundamental chemistry	6	E or above in HKCEE Chem; and Not for students with E or above in AL Chem or AS Chem.	N	N	---	---	---	Dr A P L Tong, Chemistry
CHEM1002	Chemistry: principles and concepts	6	(E or above in AL or AS Chem; or Pass in CHEM0008); and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1009, or have already enrolled in this course.	Y	N	1	Dec	200	Prof D L Phillips, Chemistry
CHEM1003	Chemistry: the molecular world	6	(E or above in AL or AS Chem; or Pass in CHEM0008); and Not for students who have already passed in CHEM1406 before; and Not for students who have passed in CHEM1401, or have already enrolled in this course.	Y	N	1, 2	Dec, May	230	Prof V W W Yam, Chemistry
CHEM1004	Chemistry: an experimental science I	6	E or above in AL or AS Chem; or Pass in CHEM0008.	Y	N	1, 2	No exam	100	Dr A P L Tong, Chemistry
CHEM1009	Basic chemistry	6	E or above in AL or AS Chem; and Not for students who have already passed in CHEM1001 before; and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1002, or have already enrolled in this course.	Y	Y	1, 2	Dec, May	240	Dr I K Chu, Chemistry
CHEM1401	Fundamentals of organic chemistry	6	(E or above in AL or AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have passed CHEM1003, or have enrolled in this course.	Y	Y	1	Dec	120	Dr P H Toy, Chemistry
CHEM1410	Basic chemistry principles for pharmacy students	6	For BPharm students only; and E or above in AL or AS Chem; and Not for students who have passed in CHEM1009, or have already enrolled in this course.	Y	Y	2	May	30	Dr E L M Wong, Chemistry
CHEM1411	Fundamentals of Organic Chemistry for Pharmacy Students	6	For BPharm students only; and E or above in AL/AS Chemistry; and Not for students who have passed in CHEM1401, or have already enrolled in this course.	Y	Y	1	Dec	30	Dr P H Toy, Chemistry
CHEM2003	Introductory instrumental chemical analysis	6	Pass in CHEM1002 or CHEM1007 or CHEM1009; and Not for students who have passed CHEM2202, or have already enrolled in this course.	Y	Y	2	May	100	Dr W T Chan, Chemistry
CHEM2102	Environmental chemistry	6	Pass in CHEM1002 or CHEM1003 or CHEM1007 or CHEM1009 or CHEM1401	Y	Y	1	Dec	100	Dr W T Chan, Chemistry

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Department of Chemistry (Cont'd)									
CHEM2103	Chemical process industries and analysis	6	Pass in CHEM1002 or CHEM1502 or CHEM1007 or CHEM1009	Y	Y	2	May	100	Prof K Y Chan, Chemistry
CHEM2109	Introduction to materials chemistry	6	Pass in CHEM1003 or CHEM1009 or CHEM1401	Y	Y	1	Dec	100	Prof W K Chan, Chemistry
CHEM2111	Directed studies in chemistry	6	Pass in CHEM1002 or CHEM1003 or CHEM1004 or CHEM1406 or CHEM2507 or CHEM2510.	Y	Y	0	No exam	---	Prof D L Phillips, Chemistry
CHEM2202	Chemical instrumentation	6	Pass in CHEM1002 or (CHEM1004 and CHEM2510) or CHEM1007 or CHEM1009	Y	Y	1	Dec	80	Dr W T Chan, Chemistry
CHEM2207	Food and water analysis	6	Pass in CHEM1002 or CHEM1003 or CHEM1004 or CHEM1007 or CHEM1009; and Pass in CHEM2202, or already enrolled in this course.	Y	Y	2	May	120	Dr Y S Fung, Chemistry
CHEM2303	Intermediate Inorganic Chemistry	6	Pass in CHEM1003; and Not for students who have already passed in CHEM2302 before.	Y	Y	1	Dec	80	Prof V W W Yam, Chemistry
CHEM2304	Bioinorganic Chemistry	6	Pass in CHEM1002 and CHEM1003 and CHEM2303	Y	Y	2	May	50	Prof H Z Sun, Chemistry
CHEM2403	Intermediate Organic Chemistry	6	Pass in CHEM1003; and Pass in CHEM2510, or already enrolled in this course; Not for students who have already passed in CHEM2402 before.	Y	Y	2	May	90	Prof D Yang, Chemistry
CHEM2410	Analytical techniques for pharmacy students	6	For BPharm students only; and Pass in CHEM1410	Y	Y	2	May	30	Dr W T Chan, Chemistry
CHEM2504	Physical Chemistry I: Introduction to Quantum Chemistry	6	Pass in CHEM1002; and Not for students who have already passed in CHEM2503 before.	Y	Y	2	May	80	Prof A S C Cheung, Chemistry
CHEM2509	Principles of chemical biology	6	Pass in CHEM1003 or CHEM1401 or CHEM1406 or BIOC1001	Y	Y	2	May	50	Dr X C Li, Chemistry
CHEM2510	Principles and applications of spectroscopic and analytical techniques	6	Pass in any CHEM1XXX level course; and Not for students who have already passed CHEM2507 before.	Y	Y	2	May	120	Dr X Li, Chemistry
CHEM3105	Chemistry project	12	Pass in CHEM2202; and CHEM2302 or CHEM2303; and CHEM2402 or CHEM2403; and CHEM2503 or CHEM2504	Y	Y	0	No exam	---	Prof D L Phillips, Chemistry
CHEM3106	Symmetry, group theory and applications	6	Pass in CHEM2303	Y	Y	1	Dec	60	Prof V W W Yam, Chemistry
CHEM3107	Interfacial science and technology	6	Pass in CHEM2503 or CHEM2504	Y	Y	2	May	50	Prof K Y Chan, Chemistry
CHEM3110	Advanced materials	6	Pass in CHEM2109	Y	Y	2	May	50	Prof W K Chan, Chemistry
CHEM3204	Modern chemical instrumentation and applications	6	Pass in CHEM2202	Y	Y	1	Dec	50	Dr I K Chu, Chemistry
CHEM3206	Analytical Chemistry	6	Pass in CHEM2202 or CHEM2207	Y	Y	2	May	100	Dr Y S Fung, Chemistry
CHEM3304	Organometallic chemistry	6	Pass in CHEM2303	Y	Y	1	Dec	40	Prof V W W Yam, Chemistry
CHEM3305	Advanced Inorganic Chemistry	6	Pass in CHEM2302 or CHEM2303; and Pass in CHEM3106, or already enrolled in this course; and Not for students who have passed in CHEM3303 before.	Y	Y	1	Dec	40	Prof C M Che, Chemistry
CHEM3404	Advanced organic chemistry	6	Pass in CHEM2402 or CHEM2403	Y	Y	1	Dec	50	Prof D Yang, Chemistry
CHEM3405	Organic chemistry of life	6	Pass in CHEM1401 or CHEM1406 or CHEM2402 or CHEM2403	Y	Y	1	Dec	50	Dr P H Toy, Chemistry
CHEM3406	Integrated Organic Synthesis	6	Pass in CHEM2402 or CHEM2403; and Not for students who have passed in CHEM3403 before.	Y	Y	2	May	---	Prof P Chiu, Chemistry
CHEM3407	Medicinal chemistry	6	Pass in CHEM1003 or CHEM2402 or CHEM2403 or CHEM3405	Y	Y	2	May	140	Prof H Z Sun, Chemistry
CHEM3410	Medicinal chemistry for pharmacy students	6	For BPharm students only; and (CHEM1401 or CHEM1411) and CHEM2410	Y	Y	2	May	30	Prof H Z Sun, Chemistry
CHEM3505	Molecular spectroscopy	6	Pass in CHEM2503	N	N	---	---	132	Prof D L Phillips, Chemistry

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Department of Chemistry (Cont'd)									
CHEM3506	Computational chemistry	6	Pass in CHEM2503 or PHYS2323; and Not for students who have passed in CHEM6109, or have already enrolled in this course.	Y	Y	2	May	60	Prof G H Chen, Chemistry
CHEM3507	Physical Chemistry II: Statistical Thermodynamics and Kinetic Theory	6	Pass in CHEM2504; and Not for students who have already passed in CHEM2503 before.	Y	Y	1	Dec	40	Dr H Hu, Chemistry
CHEM3513	Advanced physical chemistry	6	Pass in CHEM2503; and Not for students who have already passed in CHEM3504 before.	N	N	---	---	40	Prof G H Chen, Chemistry
CHEM3901	HKUtopia: Capstone Experience for Chemistry Undergraduates	6	Students are expected to have satisfactorily completed all introductory chemistry core courses and at least four advanced chemistry core courses. Students who are interested in taking the course should contact the Department for application.	Y	Y	S	No exam	---	Dr A P L Tong, Chemistry
CHEM3988	Chemistry internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Dr W T Chan, Chemistry
ENVS2008	Pollution	6	Pass in ENVS0001 or CHEM1009 or BIOL0126 or ENVS1002	Y	Y	2	May	60	Dr W T Chan, Chemistry
School of Chinese									
CSCI0001	Practical Chinese language course for science students	3	NIL (This course is compulsory for all BSc students)	Y	Y	1	Dec	---	Mr K W Wong, Chinese
CSCI2002	Advanced language studies in Chinese	3	Pass in CSCI0001	Y	Y	1	No exam	---	Mr K W Wong, Chinese
Department of Earth Sciences									
EASC0003	Natural hazards and geological risk	6	NIL	N	N	---	---	---	Dr K H Lemke, Earth Sciences
EASC0004	Early Life on Earth	6	NIL	Y	Y	2	May	---	Dr K H Lemke, Earth Sciences
EASC0009	Peaceful use of nuclear technologies	6	Not for students who have already passed in EASC0002 before.	Y	Y	1	Dec	---	Dr S H Li, Earth Sciences
EASC0105	Earth through time	6	NIL	Y	Y	2	May	---	Dr Y Li, Earth Sciences
EASC0116	Introduction to physical geology	6	NIL	Y	Y	1	Dec	---	Prof L S Chan, Earth Sciences
EASC0117	Geological heritage of Hong Kong	3	NIL	Y	N	2	No exam	45	Prof M F Zhou, Earth Sciences
EASC0118	Blue planet	6	NIL	Y	Y	1, 2	Dec, May	---	Dr P Bach, Earth Sciences
EASC0122	Introduction to climate science	6	NIL	Y	Y	2	May	---	Dr Z Liu, Earth Sciences
EASC1123	Planetary geology	6	E or above in AL Biol or Chem or Phys or Pure Math or Applied Math or Engineering Science	Y	Y	2	May	---	Dr M H Lee, Earth Sciences
EASC2004	Geophysics	6	Pass in EASC0116 or EASC0118	Y	Y	2	May	---	Prof L S Chan, Earth Sciences
EASC2005	Meteorology	6	Pass in PHYS0610 or PHYS0629	Y	Y	1	Dec	---	Dr Z Liu, Earth Sciences
EASC2108	Structural geology	6	Pass in EASC0116 or EASC0118	Y	Y	2	May	40	Dr J R Ali, Earth Sciences
EASC2109	Igneous and metamorphic petrology	6	Pass in EASC0116 or EASC0118	Y	Y	2	May	30	Prof M Sun, Earth Sciences
EASC2112	Earth systems	6	Pass in EASC0118 or EASC0116 or EASC0105	Y	Y	1	Dec	---	Prof J G Malpas, Earth Sciences
EASC2113	Sedimentology	6	Pass in EASC0105 or EASC0116 or EASC0118	Y	Y	2	May	---	Dr S C Chang, Earth Sciences
EASC2124	Geological maps and air photographs	6	Pass in EASC0118 or EASC0105 or EASC0116	Y	Y	2	No exam	---	Dr P Bach, Earth Sciences
EASC2125	Global tectonics	6	Pass in EASC0118 or EASC0105 or EASC0116	Y	Y	2	May	---	Prof J G Malpas, Earth Sciences
EASC2126	Mineralogy and geochemistry	6	Pass in EASC0118 or EASC0105 or EASC0116	Y	Y	1	Dec	30	Prof M Sun, Earth Sciences
EASC2127	Global change: anthropogenic impact	6	Pass in EASC0121 or EASC0105 or EASC0118	Y	N	1	Dec	---	Dr Z Liu, Earth Sciences
EASC2131	A cool world: ice ages and climate change	6	Pass in EASC0118 or EASC0121	Y	Y	2	May	---	Dr S H Li, Earth Sciences

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Department of Earth Sciences (Cont'd)									
EASC2201	Hydrogeology	6	Pass in EASC0116 or EASC0118	Y	Y	1	Dec	40	Prof J J Jiao, Earth Sciences
EASC2301	Field camps	6	Pass in at least 42 credits of EASC courses.	Y	Y	2	No exam	---	Prof J G Malpas, Earth Sciences
EASC2307	Directed studies in earth sciences	6	Pass in at least 18 credits of EASC0XXX level or EASC1XXX level courses; and GPA of 2.5 or above.	Y	Y	0	No exam	---	Prof M Sun, Earth Sciences
EASC3132	Earth resources	6	Pass in EASC0116 or EASC0118	Y	Y	1	Dec	40	Prof M F Zhou, Earth Sciences
EASC3133	Applied geochemistry	6	Pass in EASC2126	Y	Y	1	Dec	50	Dr K H Lemke, Earth Sciences
EASC3134	Regional geology	6	Pass in EASC2108 and EASC2125	Y	Y	1	Dec	40	Dr J R Ali, Earth Sciences
EASC3202	Soil and rock mechanics	6	Pass in EASC2201, or already enrolled in this course	Y	Y	2	May	40	Prof J J Jiao, Earth Sciences
EASC3203	Engineering geology	6	Pass in EASC2201, or already enrolled in this course	Y	Y	2	May	40	Prof J J Jiao, Earth Sciences
EASC3308	Earth sciences project	12	Pass in at least 18 credits of EASC2XXX level and EASC3XXX level courses; and GPA of 3.0 or above; and Major in Earth Sciences.	Y	Y	0	No exam	---	Prof M Sun, Earth Sciences
EASC3988	Earth sciences internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Prof L S Chan, Earth Sciences
ENVS0001	Introduction to environmental science	6	NIL	Y	Y	1	Dec	---	Dr Y Zong, Earth Sciences
ENVS2004	Environment and society	6	Pass in ENVS0001 or EASC0118	Y	Y	2	May	---	Dr Y Zong, Earth Sciences
ENVS2007	Natural hazards and mitigation	6	Pass in ENVS0001 or EASC0118 or EASC0003	Y	Y	1	Dec	---	Dr Y Zong, Earth Sciences
ENVS2011	Directed studies in environmental science	6	Pass in any three of these courses: BIOL0126, CHEM0008, CHEM1009, EASC0118, ENVS0001, ENVS1002, PHYS0625, PHYS1417; and GPA 2.5 or above in Year 1 courses; and Major in Environmental Science.	Y	Y	0	No exam	---	Dr Y Zong, Earth Sciences
ENVS2013	Environmental Oceanography	6	Pass in EASC0118; and Not for students who have passed in EASC2129.	N	Y	---	---	---	Dr Y Zong, Earth Sciences
ENVS3015	Environmental science project	12	Pass in at least 18 credits of level 2 and level 3 courses in Environmental Science major; and Students must have a GPA of 3.0 or above; and Major in Environmental Science.	Y	Y	0	No exam	---	Dr Y Zong, Earth Sciences
Department of Mathematics									
MATH0011	Numbers and patterns in nature and life	3	E or above in HKCEE Math	N	N	---	---	---	Head of Dept, Mathematics
MATH0201	Basic calculus	6	E or above in HKCEE Mathematics; and Not for students with E or above in HKCEE Add. Math or AS Math and Stat or AL Pure Math; and Not for students who have already passed in MATH0801 or before; and Not for students who have passed MATH0211, or have already enrolled in this course.	Y	N	1	Dec	---	Dr C W Wong, Mathematics
MATH0211	Basic applicable mathematics	6	(E or above in HKCEE Math or HKCEE Add. Math or AS Math & Stat); and Not for students with E or above in AL Pure Math; and Not for students who have already passed in MATH0801 before; and Not for students who have passed in MATH0201, or have already enrolled in this course.	Y	N	1, 2	Dec, May	---	Dr C W Wong, Mathematics

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Department of Mathematics (Cont'd)									
MATH1001	Fundamental concepts of mathematics	6	E or above in HKCEE Add. Math or AS Math & Stat; and Not for students who have already passed in MATH1101 before; and Not for students who have already passed in MATH1201 before.	Y	Y	1, 2	Dec, May	---	Dr Y M Chan, Mathematics
MATH1111	Linear algebra	6	(E or above in (HKCEE Add. Math and AS Math & Stat); or E or above in AL Pure Math; or Pass in MATH1804); and Not for students who have already passed in MATH1101 before; and Not for students who have already passed in MATH1102 before.	Y	N	1, 2	Dec, May	---	Dr Y K Lau, Mathematics
MATH1211	Multivariable calculus	6	(E or above in (HKCEE Add. Math and AS Math & Stat); or E or above in AL Pure Math; or Pass in MATH1804); and Not for students who have already passed in MATH1202 before.	Y	Y	1, 2	Dec, May	---	Dr G Han, Mathematics
MATH1611	Mathematical laboratory and modeling	6	E or above in HKCEE Add. Math or AS Math & Stat	Y	Y	2	May	20	Dr K H Chan, Mathematics
MATH1804	University mathematics A	6	(E or above in HKCEE Add. Math or AS Math & Stat; or Pass in MATH0201 or MATH0211); and Not for students with E or above in AL Pure Math; and Not for students who have passed in MATH1805 or MATH1211, or have already enrolled in these courses; and Not for students who have already passed in MATH0802 or MATH1811 or MATH1812 before.	Y	N	1, 2	Dec, May	---	Dr Y M Chan, Mathematics
MATH1805	University mathematics B	6	E or above in (HKCEE Add. Math and AS Math & Stat) or AL Pure Math; and Not for students who have passed in MATH1211 or MATH1813, or have already enrolled in these courses; and Not for students who have already passed in MATH1202 or MATH1803 or MATH1811 or MATH1812 before.	Y	N	2	May	---	Dr C W Wong, Mathematics
MATH1813	Mathematical methods for actuarial science	6	E or above in AL Pure Math; and Not for students who have already passed in MATH1202 or MATH1803 before; and Not for students who have passed in MATH1211 or MATH1805, or have already enrolled in these courses.	Y	N	1	Dec	---	Dr C W Wong, Mathematics
MATH2001	Development of mathematical ideas	6	Pass in MATH1111 and MATH1211	N	Y	---	---	---	Head of Dept, Mathematics
MATH2002	Mathematics seminar	6	Pass in (MATH1001, MATH1111 and MATH1211); or Pass in (MATH1001 and MATH1111) and already enrolled in MATH1211; or Pass in MATH1001; and MATH1211) and already enrolled in MATH1111. (This course is for first year BSc students only.)	Y	N	2	May	12	Dr T W Ng, Mathematics
MATH2201	Introduction to mathematical analysis	6	Pass in MATH1211 or MATH1805 or MATH1813	Y	Y	1, 2	Dec, May	---	Dr J T Chan, Mathematics

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Department of Mathematics (Cont'd)									
MATH2301	Algebra I	6	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1111 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813	Y	Y	1	Dec	---	Dr Y K Lau, Mathematics
MATH2303	Matrix theory and its applications	6	Pass in (MATH1101 and MATH1102) or MATH1111 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813	Y	Y	1	Dec	---	Dr Fullwood, Mathematics
MATH2304	Introduction to number theory	6	Pass in (MATH1101 and MATH1102) or (MATH1111 and MATH1211); and Pass in MATH2301, or already enrolled in this course.	Y	Y	2	May	---	Prof K M Tsang, Mathematics
MATH2401	Analysis I	6	Pass in (MATH1201 and MATH1202) or MATH1211 or MATH1803 or or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course.	Y	Y	1	Dec	---	Prof W S Cheung, Mathematics
MATH2402	Analysis II	6	Pass in ((MATH1201 and MATH1202) and (MATH1101 or MATH1102)) or (MATH1111 and MATH1211) or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course; and Pass in MATH2401, or already enrolled in this course.	Y	Y	2	May	---	Dr P P W Wong, Mathematics
MATH2403	Functions of a complex variable	6	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course.	Y	Y	1	Dec	---	Prof N Mok, Mathematics
MATH2405	Differential equations	6	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1111 or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813	Y	Y	2	May	---	Prof J H Lu, Mathematics
MATH2408	Computational methods and differential equations with applications	6	Pass in MATH1111 or MATH1211 or MATH1611 or MATH1803 or MATH1804 or MATH1805 or MATH1813	Y	Y	2	May	---	Dr W K Ching, Mathematics
MATH2600	Discrete mathematics	6	Pass in any two of MATH1XXX level or MATH2XXX or MATH3XXX level courses; and Not for students who have already passed MATH1800 before.	Y	Y	1	Dec	---	Prof W Zang, Mathematics

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Department of Mathematics (Cont'd)									
MATH2601	Numerical analysis	6	Pass in MATH1201 and (MATH1101 or MATH1102 or MATH1202); or Pass in MATH1202 and (MATH1101 or MATH1102 or MATH1201); or Pass in (MATH1811 or MATH1803) or (MATH1812 or MATH1803); or Pass in MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813.	Y	Y	1	Dec	---	Dr K H Chan, Mathematics
MATH2603	Probability theory	6	Pass in (MATH0801 and MATH0802) or (MATH1201 and MATH1202) or (MATH1811 and MATH1812) or MATH1111 or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1813	Y	Y	1	Dec	---	Dr J Tsai, Mathematics
MATH2901	Operations research I	6	Pass in MATH1101 and (MATH1102 or MATH1201 or MATH1202); or Pass in MATH1102 and (MATH1101 or MATH1201 or MATH1202); or Pass in MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813.	Y	Y	1	Dec	---	Prof S C K Chu, Mathematics
MATH2904	Introduction to optimization	6	Pass in ((MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2201, or already enrolled in this course.	Y	Y	2	May	---	Prof W Zang, Mathematics
MATH2905	Queueing theory and simulation	6	Pass in (STAT1301 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course.	N	Y	---	---	---	Head of Dept, Mathematics
MATH2906	Financial calculus	6	Pass in (STAT1301 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course.	Y	Y	1	No exam	---	Dr S P Yung, Mathematics
MATH2911	Game theory and strategy	6	Pass in (MATH1101 and MATH1102) or (MATH1201 and MATH1202) or MATH1211 or MATH1001 or MATH1111 or MATH1804 or MATH1805 or MATH1813	Y	Y	1	No exam	---	Dr T W Ng, Mathematics
MATH2999	Directed studies in mathematics	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2201, or already enrolled in this course; and Pass in MATH2301, or already enrolled in this course; and Pass in MATH2401, or already enrolled in this course.	Y	Y	1, 2	No exam	---	Dr T W Ng, Mathematics
MATH3302	Algebra II	6	Pass in MATH2301	Y	Y	2	May	---	Prof J T Yu, Mathematics
MATH3404	Functional analysis	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2401)	Y	Y	2	May	---	Dr C W Wong, Mathematics

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Department of Mathematics (Cont'd)									
MATH3406	Introduction to partial differential equations	6	Pass in MATH1111 and MATH1211 and MATH2201 and MATH2401; and Pass in MATH2405, or already enrolled in this course.	Y	Y	1	No exam	---	Dr S P Yung, Mathematics
MATH3501	Geometry	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2401)	Y	Y	1	Dec	---	Dr P P W Wong, Mathematics
MATH3511	Introduction to differentiable manifolds	6	Pass in (MATH2301 or MATH2303) and MATH2401 and MATH3501; and Pass in MATH2402, or already enrolled in this course.	Y	Y	2	May	---	Dr P P W Wong, Mathematics
MATH3602	Scientific computing	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2601, or already enrolled in this course.	N	Y	---	---	---	Head of Dept, Mathematics
MATH3902	Operations research II	6	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2901, or already enrolled in this course.	N	Y	---	---	---	Head of Dept, Mathematics
MATH3903	Network models in operations research	6	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2901, or already enrolled in this course.	Y	Y	2	May	---	Prof S C K Chu, Mathematics
MATH3907	Numerical methods for financial calculus	6	Pass in ((MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course; and Pass in MATH2906, or already enrolled in this course.	N	Y	---	---	---	Head of Dept, Mathematics
MATH3988	Mathematics internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Dr T W Ng, Mathematics
MATH3999	Mathematics project	12	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2301 and MATH2401)	Y	Y	0	No exam	---	Dr T W Ng, Mathematics
MATH6501	Topics in algebra	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301) or (MATH1111 and MATH1211 and MATH2301); and Pass in MATH3302, or already enrolled in this course.	Y	Y	2	May	---	Prof J T Yu, Mathematics
MATH6502	Topics in applied discrete mathematics	6	Pass in MATH2600; and Pass in MATH2301, or already enrolled in this course.	Y	Y	2	May	---	Prof S C K Chu, Mathematics
MATH6503	Topics in mathematical programming and optimization	6	(Pass MATH2901 and MATH2904); and (Pass in MATH3902, or already enrolled in this course); and (Pass in MATH3903, or already enrolled in this course).	N	Y	---	---	---	Head of Dept, Mathematics

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Department of Mathematics (Cont'd)									
MATH6504	Geometric topology	6	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2301 and MATH2401)	N	Y	---	---	---	Head of Dept, Mathematics
MATH6505	Real analysis	6	Pass in MATH2401	Y	Y	2	May	---	Prof W S Cheung, Mathematics
Department of Physics									
PHYS0003	Nature of the Universe	6	Nil (Not for students who have already passed in PHYS0001 or PHYS0002 before.)	Y	Y	1, 2	Dec, May	---	Dr K M Lee, Physics
PHYS0612	Revealing the Magic in Everyday Life	6	NIL (Not for students who have already passed in PHYS0607 before.)	Y	Y	2	May	---	Dr M K Yip, Physics
PHYS0625	Physics by inquiry	6	E or above in HKCEE Phys; and Not for students with E or above in AL Phys; and Not for students who have passed in PHYS1414 or PHYS1415 or PHYS1417, or already enrolled in these courses.	Y	Y	1	Dec	---	Dr F K Chow, Physics
PHYS0629	Weather and climate	6	E or above in HKCEE Phys	Y	Y	1	Dec	70	Dr K M Lee, Physics
PHYS1315	Methods in physics I	6	(E or above in AL Pure Math or AS Math & Stat or HKCEE Add Math; or Pass in MATH1804); and Not for students who have already passed in MATH1811 before; and Not for students who have already passed in MATH1812 before.	Y	Y	1	Dec	---	Dr F K Chow, Physics
PHYS1316	Methods in physics II	6	(E or above in AL Pure Math or AS Math & Stat or HKCEE Add Math; or Pass in PHYS1315 or MATH1804); and Not for students who have already passed in MATH1811 before; and Not for students who have already passed in MATH1812 before.	Y	Y	2	May	---	Dr W Yao, Physics
PHYS1414	General physics I	6	(E or above in HKCEE Add Math or AS Math & Stat or AL Pure Math); and (E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0114 or PHYS0625); and Not for students who have already passed in PHYS1111 or PHYS1112 or PHYS1113 or PHYS1314 before.	Y	N	1, 2	Dec, May	---	Dr M K Yip, Physics
PHYS1415	General physics II	6	(E or above in HKCEE Add Math or AS Math & Stat or AL Pure Math); and (E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0115 or PHYS0625); and Not for students who have already passed in PHYS1111 or PHYS1112 or PHYS1113 or PHYS1314 before.	Y	N	2	May	---	Dr J C S Pun, Physics
PHYS1417	Basic physics	6	(E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0625); and Not for students who have already passed in any of the following courses before: PHYS0114, PHYS0115, PHYS1111, PHYS1112, PHYS1113, PHYS1413; and Not for students who have passed in PHYS1414 or PHYS1415, or have already enrolled in either course.	Y	N	1, 2	Dec, May	---	Dr S J Xu, Physics

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				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
Department of Physics (Cont'd)									
PHYS2021	The physical universe	6	Pass in PHYS0001 or PHYS0003	Y	Y	1	Dec	---	Dr K M Lee, Physics
PHYS2022	Observational astronomy	6	Pass in PHYS0001 or PHYS0002 or PHYS0003	Y	Y	1	Dec	30	Dr J J L Lim, Physics
PHYS2039	Principles of astronomy	6	Pass in PHYS1413 or PHYS1414 or PHYS1415 or PHYS1417	Y	Y	2	May	---	Dr J J L Lim, Physics
PHYS2221	Introductory solid state physics	6	Pass in PHYS1413 or PHYS1417 or (PHYS1414 and PHYS1415); and Pass in PHYS2627, or already enrolled in this course.	Y	Y	1	Dec	---	Prof J Gao, Physics
PHYS2222	Waves and optics	6	Pass in PHYS1413 or PHYS1417 or (PHYS1414 and PHYS1415)	Y	Y	1	Dec	---	Dr J K C Leung, Physics
PHYS2227	Laser and spectroscopy	6	Pass in PHYS2222 and PHYS2323; and Pass in PHYS2221, or already enrolled in this course.	N	Y	---	---	---	Dr S J Xu, Physics
PHYS2235	Physics of nanomaterials	6	Pass in PHYS2323; and Pass in PHYS2221, or already enrolled in this course.	N	N	---	---	---	Dr S J Xu, Physics
PHYS2321	Introductory electromagnetism	6	Pass in PHYS1414 and PHYS1415 and PHYS2627	Y	Y	2	May	---	Dr X D Cui, Physics
PHYS2322	Statistical mechanics and thermodynamics	6	Pass in PHYS1414 and PHYS1415 and PHYS2627	Y	Y	2	May	---	Prof S Fung, Physics
PHYS2323	Introduction to quantum mechanics	6	Pass in PHYS2627	Y	Y	1	Dec	---	Dr W Yao, Physics
PHYS2325	Theoretical physics	6	Pass in PHYS1414 or PHYS1415 or PHYS2627; and Pass in (PHYS1315 and PHYS1316) or (MATH1804 and MATH1805) or (MATH1111 and MATH1211)	Y	Y	1	Dec	50	Prof Z D Wang, Physics
PHYS2533	Directed studies in physics	6	Pass in one of these courses: PHYS0001, PHYS0002, PHYS0003, PHYS1303, PHYS1315, PHYS1316, PHYS1414, PHYS1415, PHYS1417	Y	Y	0	No exam	---	Dr H F Chau, Physics
PHYS2626	Introductory classical mechanics	6	Pass in PHYS1413 or PHYS1417 or PHYS1414	Y	Y	1	Dec	---	Dr F C C Ling, Physics
PHYS2627	Introductory quantum physics	6	Pass in PHYS1413 or PHYS1417 or PHYS1414 or PHYS1415; and Not for students who have already passed in PHYS1314 before.	Y	N	2	May	---	Dr F C C Ling, Physics
PHYS2628	Atomic and nuclear physics	6	Pass in PHYS2627 Introductory quantum physics	Y	Y	2	May	---	Dr S Zhang, Physics
PHYS3033	General relativity	6	Pass in PHYS1303 and PHYS2321 and PHYS2322 and PHYS2323	N	Y	---	---	---	Dr T C Harko, Physics
PHYS3034	Cosmology	6	Pass in PHYS2021 or PHYS2039	N	N	---	---	---	Dr T C Harko, Physics
PHYS3036	Interstellar medium	6	Pass in PHYS2039 and PHYS2321 and PHYS2323	Y	N	1	Dec	---	Dr M H Lee, Physics
PHYS3037	Selected topics in astrophysics	6	Pass in PHYS2321 and PHYS2322 and PHYS2323	Y	Y	1	Dec	---	Prof K S Cheng, Physics
PHYS3038	Planetary science	6	Pass in PHYS2322 or PHYS2626	N	Y	---	---	---	Dr M H Lee, Physics
PHYS3040	Stellar physics	6	Pass in PHYS2021 or PHYS2321 or PHYS2322 or PHYS2323	Y	Y	2	May	---	Prof K S Cheng, Physics
PHYS3231	Computational physics	6	Pass in PHYS2321 and PHYS2322 and PHYS2323	Y	Y	2	May	---	Prof J Wang, Physics
PHYS3331	Electromagnetic field theory	6	Pass in PHYS2321 and PHYS2322 and PHYS2323 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)	Y	Y	1	Dec	---	Dr X D Cui, Physics
PHYS3332	Quantum mechanics	6	Pass in PHYS2323 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)	Y	Y	2	May	---	Prof F C Zhang, Physics

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Department of Physics (Cont'd)									
PHYS3336	Classical mechanics	6	Pass in PHYS2626 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)	Y	Y	2	May	---	Prof S Q Shen, Physics
PHYS3431	Experimental physics	6	Pass in PHYS2321 and PHYS2322 and PHYS2323 and PHYS2626	N	Y	---	---	4	TBC, Physics
PHYS3531	Physics project	12	Pass in PHYS2321 and PHYS2323	Y	Y	0	No exam	---	Dr H F Chau, Physics
PHYS3987	Quantitative tools in physics	0	Pass in PHYS1414 and PHYS1415 and PHYS2627	Y	Y	0	No exam	20	Dr F K Chow, Physics
PHYS3988	Physics internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Dr F C C Ling, Physics
PHYS6501	Computer controlled measurements in physics	6	Pass in PHYS3331 or PHYS3431	N	N	---	---	---	Dr A B Djurišić, Physics
PHYS6502	Advanced statistical mechanics	6	Pass in PHYS2322 and PHYS2627 and (PHYS3332 or PHYS3336)	Y	N	1	Dec	---	Prof J Wang, Physics
PHYS6503	Advanced electromagnetic field theory	6	Pass in PHYS3331	Y	Y	2	May	50	Prof Z D Wang, Physics
PHYS6504	Advanced quantum mechanics	6	Pass in PHYS3332	Y	Y	1	Dec	---	Prof S Q Shen, Physics
PHYS6505	Solid state physics	6	Pass in PHYS2221 and PHYS2322 and PHYS3332	N	Y	---	---	---	Prof J Wang, Physics
ENVS2006	Environmental radiation	6	Pass in ENVS0001 or PHYS1417	N	N	---	---	---	Dr J K C Leung, Physics
ENVS2010	Sustainable energy and environment	6	Pass in ENVS0001 or PHYS1417	N	Y	---	---	---	Dr A B Djurišić, Physics
Faculty of Science									
SCNC2005	Career development for science students	0	Students are expected to have satisfactorily completed their Year 1 study.	Y	Y	1, 2	No exam	200	Dr N K Tsing, Faculty
SCNC2988	Service learning internship	0	Students are expected to have satisfactorily completed their Year 1 study.	Y	Y	S	No exam	---	Dr N K Tsing, Faculty
Statistics and Actuarial Science									
STAT0301	Elementary statistical methods	6	E or above in HKCEE Math; and Not for student with E or above in AL PM; and Not for student with E or above in AS Math & Stat; and Not for students who have passed or enrolled in any of the following courses: STAT1801, STAT0302, STAT1301, STAT1306, ECON1003	Y	Y	1, 2	Dec, May	---	Mrs G M Jing, Statistics and Actuarial Science
STAT0302	Business statistics	6	For Business School students only; and Not for students who have passed or enrolled in any of the following courses: STAT0301, STAT1301, STAT1306, STAT1801, ECON1003	Y	Y	1, 2	Dec, May	---	Dr K S Chong, Statistics and Actuarial Science
STAT1301	Probability and statistics I	6	(E or above in AL PM; or Pass in MATH0211); and Not for students who have passed in STAT1306, or have already enrolled in this course; and Not for students who have passed in STAT1801, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr Y K Chung, Statistics and Actuarial Science
STAT1302	Probability and statistics II	6	Pass in STAT1301	Y	Y	2	May	---	Dr J F Yao, Statistics and Actuarial Science
STAT1303	Data management	6	(E or above in HKCEE Math or AS Math & Stat or AL PM); and Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801	Y	Y	1, 2	Dec, May	---	Dr C W Kwan, Statistics and Actuarial Science

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Department of Statistics & Actuarial Science (Cont'd)									
STAT1304	Design and analysis of sample surveys	6	(E or above in HKCEE Math or AS Math & Stat or AL PM); and Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801	Y	Y	2	May	---	Ms O T K Choi, Statistics and Actuarial Science
STAT1306	Introductory statistics	6	(E or above in AL PM or AS Math & Stat) or ((C or above in AL Phys) or (Pass in MATH0801) or (Pass in MATH0802) or (Pass in MATH0201, or already enrolled in this course) or (Pass in MATH1804, or already enrolled in this course)); and Not for students who have passed or already enrolled in any of these courses: STAT0301, STAT0302, STAT1301, STAT1801	Y	Y	1	Dec	---	Dr E K F Lam, Statistics and Actuarial Science
STAT1323	Introduction to demographic and socio-economic statistics	6	(E or above in HKCEE Math or AS Math & Stat or AL Pure Maths); and Pass or already enrolled in any of these courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801; and Not for students who have already passed in STAT1305 before.	Y	Y	2	May	---	Ms L M S Kwan, Statistics and Actuarial Science
STAT1801	Probability and statistics: foundations of actuarial science	6	(E or above in AL Pure Math or AS Math & Stat; or (Pass in MATH1813, or already enrolled in this course); and Not for students who have passed or enrolled in any of these courses: STAT0301, STAT0302, STAT1301, STAT1306.	Y	Y	1	Dec	---	Dr Y K Chung, Statistics and Actuarial Science
STAT1802	Financial mathematics	6	(E or above in AL Pure Math or AS Math & Stat); and (Pass in STAT1302, or already enrolled in this course; or Pass in STAT1801, or already enrolled in this course); and Not for students who have passed in STAT2315, or have already enrolled in this course.	Y	Y	2	May	---	Prof K C Yuen, Statistics and Actuarial Science
STAT2301	Linear statistical analysis	6	Pass in STAT1302; and Not for students who have passed in STAT2804, or have already enrolled in this course.	Y	Y	1	Dec	---	Prof T W K Fung, Statistics and Actuarial Science
STAT2302	Statistical inference	6	Pass in STAT1302 or STAT2802	Y	Y	1	Dec	---	Prof S M S Lee, Statistics and Actuarial Science
STAT2303	Probability modelling	6	Pass in STAT1301; and Not for students who have passed in MATH2603, or have already enrolled in this course; and Not for students who have passed in STAT2803, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr K S Chong, Statistics and Actuarial Science
STAT2304	Design and analysis of experiments	6	Pass in STAT1302 or STAT2802 or STAT2311	Y	Y	2	May	---	Dr G Li, Statistics and Actuarial Science
STAT2305	Quality control and management	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT2802	Y	Y	2	May	---	Dr K S Chong, Statistics and Actuarial Science

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Department of Statistics & Actuarial Science (Cont'd)									
STAT2306	Business logistics	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801; and Not for students who have passed MATH2901, or have already enrolled in this course.	Y	Y	1	Dec	---	Ms O T K Choi, Statistics and Actuarial Science
STAT2307	Statistics in clinical medicine and bio-medical research	6	Pass in STAT1302 or STAT2802	Y	Y	2	May	---	Dr G Yin, Statistics and Actuarial Science
STAT2308	Statistical genetics	6	Pass in STAT1302 or STAT2802	Y	Y	2	May	---	Prof T W K Fung, Statistics and Actuarial Science
STAT2309	The statistics of investment risk	6	Pass in STAT1302 or STAT1306 or STAT2311 or STAT2314; and Not for students who have passed in FINA2802, or have already enrolled in this course. (Any student who has already passed in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1801 in 2009-10 or before can still apply for this course.) (Not available to Actuarial Science students)	Y	Y	1	Dec	---	Mr K P Wat, Statistics and Actuarial Science
STAT2310	Risk management and insurance	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801. (Not available to Actuarial Science students)	Y	Y	2	May	---	Dr R W L Wong, Statistics and Actuarial Science
STAT2311	Computer-aided data analysis	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1306; and Not for students who have passed in STAT1301, or have already enrolled in this course; and Not for students who have passed in STAT1801, or have already enrolled in this course; and Not for students who have passed in STAT3304, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr E K F Lam, Statistics and Actuarial Science
STAT2312	Data mining	6	Pass in STAT1302 or STAT1306 or STAT2802 (Any student who has already passed in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1801 in 2009-10 or before can still apply for the course in 2012-2013.)	Y	Y	2	No exam	48	Dr G C S Lui, Statistics and Actuarial Science
STAT2313	Marketing engineering	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801	Y	Y	1	Dec	---	Dr C W Kwan, Statistics and Actuarial Science
STAT2314	Business forecasting	6	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1306; and Not for students who have passed or already enrolled in any of these courses: STAT1301, STAT1801, STAT2804, STAT3301, ECON0701.	N	Y	---	---	---	Dr R W L Wong, Statistics and Actuarial Science
STAT2315	Practical mathematics for investment	6	Pass in STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801; and Not for students who have passed in STAT1802, or have already enrolled in this course.	Y	Y	2	May	---	Dr T S T Wong, Statistics and Actuarial Science

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Department of Statistics & Actuarial Science (Cont'd)									
STAT2316	Advanced SAS programming	6	Pass in STAT1303	N	Y	---	---	96	TBC, Statistics and Actuarial Science
STAT2317	Sample survey methods	6	Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801	N	Y	---	---	---	Head of Dept, Statistics and Actuarial Science
STAT2318	Directed studies in statistics	6	Major in Statistics or Risk Management; and Pass in 18 credits from the following courses: STAT0301, STAT0302, STAT1301, STAT1302, STAT1303, STAT1304, STAT1306, STAT1323, STAT1801, STAT1802; and Not for students who have already enrolled in STAT3319 in this academic year; and Not for students admitted in 2006 or before.	Y	Y	0	No exam	30	Prof S M S Lee, Statistics and Actuarial Science
STAT2801	Life contingencies	6	(Pass in STAT1302 and STAT2315) or (Pass in STAT1802 and (Pass in STAT2802, or already enrolled in this course)) or (Pass in STAT1302 and STAT1802)	Y	Y	1	Dec	---	Dr E C K Cheung, Statistics and Actuarial Science
STAT2802	Statistical models	6	Pass in STAT1801. (For BSc(Actuarial Science) students only)	Y	Y	1	Dec	---	Dr G Tian, Statistics and Actuarial Science
STAT2803	Stochastic models	6	For BSc(Actuarial Science) students only; and Pass in STAT1801; and Not for students who have passed in MATH2603, or have already enrolled in this course; and Not for students who have passed in STAT2303, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr J F Yao, Statistics and Actuarial Science
STAT2804	Linear models and forecasting	6	(Pass in STAT1302; or Pass in STAT2802, or already enrolled in this course); and For BSc(Actuarial Science) students only; and Not for students who have passed in STAT2301, or have already enrolled in this course; and Not for students who have passed in STAT3301, or have already enrolled in this course; and Not for students who have passed in ECON0701, or have already enrolled in this course.	Y	Y	2	May	---	Prof Y Lam, Statistics and Actuarial Science
STAT2805	Credibility theory and loss distributions	6	Pass in STAT1302 or STAT2802 or STAT3810	Y	Y	1	Dec	---	Dr K C Cheung, Statistics and Actuarial Science
STAT2807	Corporate finance for actuarial science	6	Pass in BUSI1002 and STAT1802; or Pass in STAT2310 and STAT2315.	Y	Y	2	May	---	Dr J K Woo, Statistics and Actuarial Science
STAT2812	Financial economics I	6	Pass in STAT1302 or STAT2802; and Not for students who have passed in STAT3303, or have already enrolled in this course; and Not for students who have passed in FINA0301, or have already enrolled in this course.	Y	Y	1	Dec	---	Prof H L Yang, Statistics and Actuarial Science

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Department of Statistics & Actuarial Science (Cont'd)									
STAT2813	Internship in actuarial science	6	Pass in STAT1802 or STAT2801; and For BSc(Actuarial Science) students only	Y	Y	1, 2	No exam	---	Dr L F K Ng, Statistics and Actuarial Science
STAT2820	Introduction to financial derivatives	6	Pass in STAT1802; and For BSc(Actuarial Science) students only; and Not for students who have passed in STAT3303, or have already enrolled in this course; and Not for students who have already passed in STAT3308 before; and Not for students who have passed in FINA0301, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr E C K Cheung, Statistics and Actuarial Science
STAT3301	Time-series analysis	6	Pass in STAT2301; and Not for students who have passed in STAT2314, or have already enrolled in this course; and Not for students who have passed in STAT2804, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr G Li, Statistics and Actuarial Science
STAT3302	Multivariate data analysis	6	Pass in STAT2301 or STAT2804	Y	Y	2	May	60	Prof T W K Fung, Statistics and Actuarial Science
STAT3303	Derivatives and risk management	6	Pass in STAT2315; and Not for BSc(Actuarial Science) students; and Not for students who have passed in STAT2812, or have already enrolled in this course; and Not for students who have passed in STAT2820, or have already enrolled in this course; and Not for students who have passed in FINA0301, or have already enrolled in this course; and Not for students who have already passed in STAT3308 before.	Y	Y	1	Dec	---	Dr R W L Wong, Statistics and Actuarial Science
STAT3304	Computer-aided statistical modelling	6	Pass in STAT2301 or STAT2804; and Not for students who have passed in STAT2311, or have already enrolled in this course.	Y	Y	2	May	60	Dr G Tian, Statistics and Actuarial Science
STAT3306	Selected topics in statistics	6	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT6009.	Y	Y	1	Dec	---	Prof S M S Lee, Statistics and Actuarial Science
STAT3316	Advanced probability	6	Pass in STAT2303 or STAT2803. This course is mutually exclusive to STAT6010.	Y	Y	1	Dec	---	Prof Y Lam, Statistics and Actuarial Science
STAT3317	Computational statistics	6	Pass in STAT2301. This course is mutually exclusive to STAT6011.	Y	Y	1	Dec	---	Dr G Tian, Statistics and Actuarial Science
STAT3319	Statistics project	12	Pass in STAT2301; and Not for students who have already enrolled in STAT2318 in this academic year	Y	Y	0	No exam	15	Prof S M S Lee, Statistics and Actuarial Science
STAT3320	Risk management and Basel Accords in banking and finance	6	Pass in STAT2812 or STAT2820 or STAT2808 or STAT3303 or STAT3308 or FINA0301; and Not for students who have already passed in STAT2320 before.	Y	Y	2	May	---	Mr P K Y Pang, Statistics and Actuarial Science
STAT3321	Credit risk analysis	6	Pass in STAT2812 or STAT3303 or STAT3308 or STAT2808 or STAT2820 or FINA0301, or already enrolled in one of these courses.	Y	Y	2	May	---	Mr K P Wat, Statistics and Actuarial Science

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
Department of Statistics & Actuarial Science (Cont'd)									
STAT3322	Market risk analysis	6	Pass in ECON1001 or FINA2802 or STAT2309; or Pass in STAT2812 or STAT2806, or already enrolled in either course.	Y	Y	2	May	---	Dr Z Zhang, Statistics and Actuarial Science
STAT3323	Current topics in risk management	6	Pass in STAT3301	N	Y	---	---	---	Head of Dept, Statistics and Actuarial Science
STAT3801	Advanced life contingencies	6	Pass in STAT2801, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May	---	Dr L F K Ng, Statistics and Actuarial Science
STAT3802	Advanced contingencies	6	Pass in STAT3801; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec	---	Prof H L Yang, Statistics and Actuarial Science
STAT3806	Investment and asset management	6	Pass in STAT2801; and For BSc(Actuarial Science) students only; and Not for students who have passed in FINA2802, or have already enrolled in this course.	N	Y	---	---	---	Head of Dept, Statistics and Actuarial Science
STAT3807	Fundamentals of actuarial practice	6	Pass in STAT3801; and For BSc(Actuarial Science) students only.	Y	Y	1	No exam	---	Dr L F K Ng, Statistics and Actuarial Science
STAT3809	Current topics in actuarial science	6	(Pass in STAT2801, or already enrolled in this course; or Pass in STAT3801, or already enrolled in this course); and For BSc(Actuarial Science) students only.	Y	Y	2	No exam	---	Prof W K Li, Statistics and Actuarial Science
STAT3810	Risk theory	6	Pass in STAT2803, or already enrolled in this course; or Pass in STAT2303 or MATH2603	Y	Y	2	May	---	Dr K C Cheung, Statistics and Actuarial Science
STAT3811	Survival analysis	6	Pass in STAT2802, or already enrolled in this course; or Pass in STAT2301 or STAT2801	Y	Y	2	May	---	Dr E K F Lam, Statistics and Actuarial Science
STAT3819	Project in statistics and actuarial science	6	For BSc(Actuarial Science) students only.	Y	Y	0	No exam	---	Prof S M S Lee, Statistics and Actuarial Science
STAT3820	Pension Funds and Pension Mathematics	6	Pass in STAT3801; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec	---	Dr G Ma, Statistics and Actuarial Science
STAT3821	Financial economics II	6	Pass in MATH2603 or STAT2803 or STAT2806 or STAT2812 or STAT3316	Y	Y	2	May	---	Dr E C K Cheung, Statistics and Actuarial Science
STAT3822	Risk Theory II	6	Pass in STAT3810	Y	Y	1	Dec	---	Dr J K Woo, Statistics and Actuarial Science
STAT3988	Statistics internship	6	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	1, 2, S	No exam	---	Dr P L H Yu, Statistics and Actuarial Science
STAT3989	Essential IT skills for statistical and risk analysts	0	Students are expected to have satisfactorily completed their Year 2 study.	Y	Y	S	No exam	48	Dr C W Kwan, Statistics and Actuarial Science
STAT6109	Research methods in statistics	6	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT3306.	N	Y	---	---	---	Prof S M S Lee, Statistics and Actuarial Science
STAT6110	Advanced probability	6	Pass in STAT2303 or STAT2803. This course is mutually exclusive to STAT3316.	N	Y	---	---	---	Prof Y Lam, Statistics and Actuarial Science
STAT6111	Computational statistics	6	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT3317.	N	Y	---	---	---	Dr G Tian, Statistics and Actuarial Science
STAT6114	Advanced statistical modelling	6	Pass in STAT2301	Y	Y	2	May	---	Dr J F Yao, Statistics and Actuarial Science
STAT6115	Advanced quantitative risk management and finance	6	Pass in STAT3322	Y	Y	2	May	---	Prof W K Li, Statistics and Actuarial Science

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer			
Science 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 III

List of Courses for Faculty Electives:

Block A, B And C

SCIENCE

SECTION III List of Courses for Faculty Electives: Blocks A, B and C

A. List of Courses in Blocks A, B and C (for students admitted to the first year in 2009-10)

Block A - Quantitative Reasoning

Course Code	Credit	Title	Remarks
MATH0201	6	Basic calculus	Bridging course for students with HKCEE Mathematics only
MATH1001	6	Fundamental concepts of mathematics	
MATH1111	6	Linear algebra	
MATH1804	6	University mathematics A	Bridging course for students with AS Mathematics & Statistics only
STAT0301	6	Elementary statistical methods	Bridging course for students with HKCEE Mathematics only Bridging course for students with AS Mathematics & Statistics only
STAT1301	6	Probability and statistics I	
STAT1306	6	Introductory statistics	

Block B - Physical World

Course Code	Credit	Title	Remarks
CHEM0008	6	Fundamental chemistry	Bridging course for students with HKCEE Chemistry only
CHEM1002	6	Chemistry: principles and concepts	
CHEM1009	6	Basic chemistry	
EASC0105	6	Earth through time	
EASC0118	6	Blue planet	
ENVS0001	6	Introduction to environmental science	
PHYS0001	3	Nature of the universe I: introduction to observational astronomy and the solar system	(Course obsoleted)
PHYS0002	3	Nature of the universe II: stars, galaxies and cosmology for beginners	(Course obsoleted)
PHYS0003	6	Nature of the universe	
PHYS0625	6	Physics by inquiry	Bridging course for students with HKCEE Physics only
PHYS1414	6	General physics I	
PHYS1417	6	Basic physics	

Block C - Life & Living

Course Code	Credit	Title	Remarks
BIOC1003	6	Introduction to molecular genetics	
BIOL0002	3	Introduction to food and nutritional science	(Course obsoleted)
BIOL0126	6	Fundamentals of biology	Bridging course for students with HKCEE Biology only
BIOL0129	3	Introductory microbiology	(Course obsoleted)
BIOL0135	6	Introductory microbiology	
BIOL0625	6	Ecology and evolution	
BIOL1122	6	Functional biology	
BIOL1125	6	Introduction to biochemistry	
ENVS1002	6	Environmental life science	

B. List of Courses in Blocks A, B and C (for students admitted to the first year in 2010-11)

Block A - Quantitative Reasoning

Course Code	Credit	Title	Remarks
MATH0201	6	Basic calculus	Bridging course for students with HKCEE Mathematics only
MATH1001	6	Fundamental concepts of mathematics	
MATH1111	6	Linear algebra	
MATH1804	6	University mathematics A	Bridging course for students with AS Mathematics & Statistics only
STAT0301	6	Elementary statistical methods	Bridging course for students with HKCEE Mathematics only Bridging course for students with AS Mathematics & Statistics only
STAT1301	6	Probability and statistics I	
STAT1306	6	Introductory statistics	

Block B - Physical World

Course Code	Credit	Title	Remarks
CHEM0008	6	Fundamental chemistry	Bridging course for students with HKCEE Chemistry only
CHEM1002	6	Chemistry: principles and concepts	
CHEM1009	6	Basic chemistry	
EASC0105	6	Earth through time	
EASC0118	6	Blue planet	
ENVS0001	6	Introduction to environmental science	
PHYS0001	3	Nature of the universe I: introduction to observational astronomy and the solar system	(Course obsoleted)
PHYS0002	3	Nature of the universe II: stars, galaxies and cosmology for beginners	(Course obsoleted)
PHYS0003	6	Nature of the universe	
PHYS0625	6	Physics by inquiry	Bridging course for students with HKCEE Physics only
PHYS1414	6	General physics I	
PHYS1417	6	Basic physics	

Block C - Life & Living

Course Code	Credit	Title	Remarks
BIOC1003	6	Introduction to molecular genetics	
BIOL0126	6	Fundamentals of biology	Bridging course for students with HKCEE Biology only
BIOL0625	6	Ecology and evolution	
BIOL1122	6	Functional biology	
BIOL1125	6	Introduction to biochemistry	
ENVS1002	6	Environmental life science	

C. List of Courses in Blocks A, B and C (for students admitted to the first year in 2011-12)

Block A - Quantitative Reasoning

Course	Credit	Title	Remarks
MATH0201	6	Basic calculus	Bridging course for students with HKCEE Mathematics only
MATH1001	6	Fundamental concepts of mathematics	
MATH1111	6	Linear algebra	
MATH1804	6	University mathematics A	Bridging course for students with AS Mathematics & Statistics only
STAT0301	6	Elementary statistical methods	Bridging course for students with HKCEE Mathematics only Bridging course for students with AS Mathematics & Statistics only
STAT1301	6	Probability and statistics I	
STAT1306	6	Introductory statistics	

Block B - Physical World

Course	Credit	Title	Remarks
CHEM0008	6	Fundamental chemistry	Bridging course for students with HKCEE Chemistry only
CHEM1002	6	Chemistry: principles and concepts	
CHEM1009	6	Basic chemistry	
EASC0105	6	Earth through time	
EASC0118	6	Blue planet	
ENVS0001	6	Introduction to environmental science	
PHYS0001	3	Nature of the universe I: introduction to observational astronomy and the solar system	(Course obsoleted)
PHYS0002	3	Nature of the universe II: stars, galaxies and cosmology for beginners	(Course obsoleted)
PHYS0003	6	Nature of the universe	
PHYS0625	6	Physics by inquiry	Bridging course for students with HKCEE Physics only
PHYS1414	6	General physics I	
PHYS1417	6	Basic physics	

Block C - Life & Living

Course	Credit	Title	Remarks
BIOC1003	6	Introduction to molecular genetics	
BIOL0126	6	Fundamentals of biology	Bridging course for students with HKCEE Biology only
BIOL0625	6	Ecology and evolution	
BIOL1122	6	Functional biology	
BIOL1125	6	Introduction to biochemistry	
ENVS1002	6	Environmental life science	

D. List of Courses in Blocks A, B and C (for students admitted to the first year in 2012-13)

Block A - Quantitative Reasoning

Course Code	Credit	Title	Remarks
MATH0201	6	Basic calculus	Bridging course for students with HKCEE Mathematics only
MATH1001	6	Fundamental concepts of mathematics	
MATH1111	6	Linear algebra	
MATH1804	6	University mathematics A	Bridging course for students with AS Mathematics & Statistics only
STAT0301	6	Elementary statistical methods	Bridging course for students with HKCEE Mathematics only Bridging course for students with AS Mathematics & Statistics only
STAT1301	6	Probability and statistics I	
STAT1306	6	Introductory statistics	

Block B - Physical World

Course Code	Credit	Title	Remarks
CHEM0008	6	Fundamental chemistry	Bridging course for students with HKCEE Chemistry only
CHEM1002	6	Chemistry: principles and concepts	
CHEM1009	6	Basic chemistry	
EASC0105	6	Earth through time	
EASC0118	6	Blue planet	
ENVS0001	6	Introduction to environmental science	
PHYS0003	6	Nature of the universe	
PHYS0625	6	Physics by inquiry	Bridging course for students with HKCEE Physics only
PHYS1414	6	General physics I	
PHYS1417	6	Basic physics	

Block C - Life & Living

Course Code	Credit	Title	Remarks
BIOC1003	6	Introduction to molecular genetics	
BIOL0126	6	Fundamentals of biology	Bridging course for students with HKCEE Biology only
BIOL0625	6	Ecology and evolution	
BIOL1122	6	Functional biology	
BIOL1125	6	Introduction to biochemistry	
ENVS1002	6	Environmental life science	

SECTION IV

Experiential Learning for Science Students

SCIENCE

SECTION IV Experiential Learning for Science Students

「不聞不若聞之，聞之不若見之，見之不若知之，知之不若行之，學至於行而止矣。」

- 荀子《儒效篇》

"Not having heard is not as good as having heard, having heard is not as good as having seen, having seen is not as good as mentally knowing, mentally knowing is not as good as putting into action; true learning is complete only when action has been put forth."

- Xunzi (ca 313-238 BC), *Confucian Devotional Writing*

1. Background

In order to provide students with an integrated and holistic education, the Faculty of Science has included an element of Experiential Learning (EL) within the new BSc curriculum, for which all students admitted in or after 2007 must engage in at least one form of EL activities for graduation.

At present, most of the teaching and learning in our curriculum is implemented through a classroom setting. Although lecture- and classroom-based learning has its rightful place in the university curriculum because of its high efficiency in delivering static information and knowledge, its limitations are also obvious. For example, it does not provide a nurturing environment to foster independent learning, and lacks flexibility to allow students to attempt specific topics that cater to their individual interest and ability. It also tends to shield students from the outside world, and fails to facilitate meaningful practices for students to apply what they have learned to real situations. Besides, pedagogy in a traditional classroom setting is difficult to encourage students taking initiative and a more active role in their own learning. In these regards, a multitude of various educational activities need to be introduced to address these limitations. EL activities are such educational activities that can complement and enhance the curriculum so as to give students an all-rounded and whole-person education.

We classify EL activities into the following five categories:

1. Project-based learning
2. Field Studies
3. Internship and Professional Preparation Programme
4. Exchange studies
5. Other form of EL

By participating in different kinds of EL activities, students are expected:

- to gain working experience in a real-world workplace environment
- to have diverse learning experience
- to integrate theory and practice, and to understand limitations of their current knowledge
- to engage in research in their majored science discipline
- to prepare for their life-long career
- to broaden their social and cultural experience, and to develop their social and cultural values
- to work in a team and to collaborate with people with diverse background

These learning objectives fit well within the framework of the future 4-Year Undergraduate Curriculum of the University, in which "diverse learning experiences," "multiple forms of learning and assessment," "multidisciplinary collaboration," "engagement with local and global communities," and "development of civic and moral values" have been identified as five of the seven distinctive features (the remaining two features are "(inter)disciplinary inquiry" and "polycontextual inquiry") of the new curriculum. [Transforming Student Learning: 4-Year Undergraduate Curriculum Reform (Discussion Document), Steering Committee, HKU, May 2006] Obviously, it is unrealistic to expect any single EL activity to embrace *all* the aforementioned learning objectives. On the other hand, students are not restricted from taking more than one EL activity, and they have options to choose EL activities that suit their individual circumstances and educational needs.

2. Formats and Requirements

EL is a mandatory component in the BSc curriculum and all students must pass this requirement for his/her primary major for graduation. The workload of EL is equivalent to at least a 6-credit advanced level course. Some of the EL activities are credit bearing and some are not. In a circumstance that the EL activities are non-credit bearing, students have to take a 6-credit advanced level course in their primary major to complete the credit requirements. For the second major, it is not required for the student to take EL but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

EL activities vary in nature and length of time. EL activities, once being successfully completed, will be listed in the transcript. At present the Faculty does not restrict a student from taking more than one EL activity. The following is a list of EL activities and the requirements currently recognized by the Faculty. More EL courses and activities may be added to the list in future.

Category 1: Project-based Learning

Project-based learning allows students to have an in-depth study of a specific topic, which is often not fully covered in regular courses, through individual and independent research. On one hand, students taking project-based EL activities will receive more attention from their supervising teachers when compared with those in regular courses, on the other hand these students will need to take more initiative and be more self-reliant in order to perform well in their learning. Free from a rigid syllabus, project-based learning often allows greater student participation in formulating the framework, contents and goals of the learning according to the student's individual interest and ability. In this respect, project-based learning is a truly personalized learning experience. It also provides perfect opportunities for students to test out and to realize their potential in conducting scientific research or pursuing further study in related disciplines. As students will normally need to integrate knowledge they have acquired throughout the curriculum and apply in a non-trivial manner on the project, project-based learning is also a valuable capstone experience. Thesis and Report writing and oral presentations are essential elements of project-based learning, as they will enable students to learn how to present complex information, to express difficult ideas and to communicate them effectively to others.

1. Final Year Project
   Students who have taken adequate advanced-level core courses in their science major may take a Final Year Project to engage in an in-depth study or research on a specific topic under the supervision of a staff member. As the work involved in these projects demands a high level of academic well-preparedness and intellectual maturity of the student, usually only final year students with good academic standing are allowed to enroll. Workload of these 12-credit projects are also expected to be substantial. These projects, which usually contain an element of originality, will give students an early experience of conducting serious scientific research.

   Credit : 12 credits
   Requirements : Substantial work expected and requires a presentation and submission of a written final report.
   Courses offered : BIOC3614, BIOL3321, CHEM3105, EASC3308, ENVS3015, MATH3999, PHYS3531, STAT3319

2. Directed Studies
   Students choosing this form of EL will undertake a self-managed study under the supervision of a staff member. The directed study can be a critical review or a synthesis of published work on the subject, or a small scale project on a specific topic of the subject, or a laboratory or field study that would enhance the student's understanding of the subject.

   Credit : 6 credits
   Requirement : Requires a presentation and submission of a written final report.
   Courses offered : BIOC2616, BIOL2320, CHEM2111, EASC2307, ENVS2011, MATH2999, PHYS2533, STAT2318

3. Seminar Course
   Students taking a seminar course are required to undertake private study of material, usually research articles or books that are designated by the teacher. They are required also to take turns to give presentations in class meetings, and to participate in discussions during such meetings. Student will learn in a highly active and inter-active manner the topics that are covered by the material they study. They will also be able to acquire many core learning skills such as literature searching and reviewing, self-managed study on the subject, synthesizing and presenting the material they have studied, and analyzing and critiquing the material and views presented by their fellow students.

   Credit : 6 credits
   Requirement : Requires class presentations, participation in class discussions, and submission of a written final report. Some seminar courses may also require a final examination.
   Course offered : MATH2002

4. HKUtopia: Capstone Experience for Chemistry Undergraduates
   This project-based course with the theme of Chemistry for a Better Living in a Foreseeable Future aims to provide students with a capstone experience. It aims to enable students to think what are the key issues the world is facing with that have to be solved by chemistry and related technology. Students will need to apply what they have learnt in classroom and conduct literature search regarding advanced chemistry research and related technology under development to solve the problems identified in their project using various channels.

   Credit : 6 credits
   Requirements : Students are expected to have satisfactorily completed all introductory chemistry core courses and at least four advanced chemistry core courses. Students who are interested in taking the course should contact the Department for application.
   Course offered : CHEM3901

5. Summer Research Fellowship (SRF)
   A limited number of fellowships (about 20 each year) are available for first and second year students for in-Faculty research in the summer. Students awarded with SRF are expected to work in the Faculty on a specific research project for at least 8 weeks during the summer. Successful applicants will be awarded with a stipend for their summer research work. Students have to approach prospective supervisors for research opportunities and recommendations. Upon completion of the research, students are required to submit a report of their research work and give a presentation at a research colloquium organized by the Faculty.

   Credit : Non-credit bearing
   Requirements : Requires submission of a written final report and presentation at a research colloquium organized by the Faculty.

6. Overseas Research Fellowship (ORF)
   A limited number of fellowships are available to first and second year students for overseas research opportunities in the summer. Students awarded with ORF are expected to conduct research projects under supervision by faculty members of overseas universities or institutions for at least 8 weeks during summer. Successful applicants will be awarded with a stipend. Students have to approach prospective supervisors for research opportunities and recommendations. Upon completion of the research, students are required to submit a report of their research work and give a presentation at a research colloquium organized by the Faculty.

   Credit : Non-credit bearing
   Requirements : Requires submission of a written final report and presentation at a research colloquium organized by the Faculty.

Category 2: Field Studies

Field studies provide students with first-hand, on-site learning which is not possible inside a classroom or a laboratory. In addition, students are often required to perform a number of tasks so as to acquire skills that are essential in their studied discipline.

7. Field Course

   Credit : 6 credits
   Requirements : 12 days or more in the field. Field course must be part of the curriculum and with formal assessment.
   Courses offered : BIOL2318, EASC2301

8. Environmental science in practice
   To provide students experiential learning experience in the field of environmental science. The course is primarily based on an array of relevant field studies covering the four essential areas of the major. Invited guest lectures delivered by environmental practitioners may be held. Students are expected to recognize ways of environmental science in practice, gain knowledge of current environmental problems and solutions, and be able to present and communicate their field observations and findings.

   Credit : 6 credits
   Requirement : Students will take part in at least 48 hours of field trips (about 8 trips) and 18 hours of guided discussions and invited guest lectures (6 sessions). Some trips will be organized in the reading weeks, and others in weekends.
   Course offered : ENVS3016

Category 3: Internship and Professional Preparation Programme

EL activities under this category either help students to gain meaningful working experience or to prepare them for their future career.

9. Discipline Internship
The discipline specific internship course aims to offer students the opportunities to gain work experience in the industry related to their major of study. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Department. Upon completion of the internship, students must submit a written report and give a presentation.

Credit	:	6 credits (with Pass/Fail grade)
Requirement	:	At least 160 hours of internship work either within the University or outside the University arranged by the School/Department. Upon completion of the internship, students must submit a written report and give a presentation.
Courses offered	:	BIOC3988, BIOL3988, CHEM3988, EASC3988, ENVS3988, MATH3988, PHYS3988, STAT3988

10. Service Learning Internship
The course aims to offer students the opportunities to learn through active participation in organized service activities and to help develop their social consciousness and commitment so as to become a responsible citizen. Though it may not be related to their major of study, it would be of great benefits to students to apply their knowledge and scientific mind acquired in their study to provide meaningful services to society. It also aims to achieve some educational aims of the University, such as leadership and advocacy for the improvement of human condition and tackling novel situations. Students have to take on at least 120 hours of internship work either within the University or outside the University arranged by the Faculty.

Credit	:	Non-credit bearing (with Pass/Fail grade)
Requirement	:	At least 120 hours of internship work either within the University or outside the University arranged by the Faculty.
Remarks	:	(i) The course is for Year 2 / Year 3 students only. (ii) Enrollment priority will be given to those students who have not taken any EL activities.
Course offered	:	SCNC2988

11. Career Development for Science Students
The Career Development for Science Students course is jointly offered by the Faculty of Science and the Centre of Development and Resources for Students (CEDARS). It comprises modules on Readiness, Career Exposure, Skill-based training, Communication and adjustment in workplace. The course is designed to enhance students' personal and career preparation skills through a variety of activities including seminars, practical workshops, small group discussions, role play, and company visits. It aims to facilitate students in making informed career choices, provide training to enhance communication, presentation, time management skills, and enhance the students' employability.

Credit	:	Non-credit bearing (with Pass/Fail grade)
Requirements	:	Class attendance and course work
Remarks	:	(i)The course is for Year 2 / Year 3 students only. (ii) Enrollment priority will be given to those students who have not taken any EL activities.
Course offered	:	SCNC2005

12. Essential IT Skills for Statistical and Risk Analysts
Essential IT Skills for Statistical and Risk Analysts course is offered to students majoring in Statistics or Risk Management. It aims to enhance students' IT knowledge and skills which are not covered in the current curriculum but are essential for career development of statistical and risk analysts. The course may contain a variety of activities including computer hand-on workshops on VBA programming, MS-office and SPSS, group projects, and company visits.

Credit	:	Non-credit bearing (with Pass/Fail grade)
Requirement	:	At least 120 hours of experiential learning activities. The course is a four-week course consisting of 60 hours of demonstration and hand-on exercises of the computer software conducted in a computer laboratory, and 60 hours for a group project and some firm visits.
Remarks	:	(i) The course is for Year 2 / Year 3 BSc Risk Management and Statistics major students only. (ii) Enrollment priority will be given to those students who have not taken any EL activities.
Course offered	:	STAT3989

13. Quantitative tools in physics
Quantitative tools in physics course is offered to students majoring in Astronomy; Mathematics/Physics or Physics. It aims to enable students to use a few quantitative software packages that are commonly used in physics computation, experiment and presentation through mainly hands on projects. Since these software packages are generally used by researchers in both academic and industrial institutions, successful completion of this pass/fail course allows students to better prepare themselves to a physics and astronomy research career, in particular, those works that involve heavy computational and/or experimental elements.

Credit	:	Non-credit bearing (with Pass/Fail grade)
Requirement	:	The course consists of 4 hours of lectures, 10 hours of tutorials, 60 hours of hands on experience and self study, and 60 hours of project work.
Course offered	:	PHYS3987

Category 4: Exchange Study

Exchange study in overseas universities provides students with rich learning experience in a different educational, social and cultural environment. It will help students broaden their exposure, extend their horizon, and develop a global perspective.

14. Exchange Study

Credit	:	Non-credit bearing
Requirements	:	At least 1 semester (1^{st} or 2^{nd} semester), the exchange study must be through the HKU Worldwide Exchange Programme or Science Faculty/Department Level Exchange Programmes.

Category 5: Other Form of Experiential Learning

To offer more options of EL to students, some suitable activities and courses other than those in the previous categories will be considered and determined by the Faculty as qualified EL activities. At present the Intensified Learning Opportunity Programme is one such qualified EL activity. More qualified EL activities may be introduced in the future.

15. Intensified Learning Opportunity Programme (ILOP)
This 14 month programme is offered by CEDARS to produce graduates of distinction committed to lifelong learning, integrity and professionalism, capable of being responsive leaders and communicators in their fields. The programme is mainly for second year students. Application is usually in October each year. It provides training in personal development, global citizenship, social equality and advocacy, and cultural awareness. It also includes an overseas internship and a mentorship scheme.

Credit	:	Non-credit bearing
Requirements	:	Students who are selected and have successfully completed the programme are deemed to have satisfied the EL requirement.

3. Summary of Experiential Learning Activities for Each Major

The following list of courses and activities are currently recognized as EL courses and activities.

Major	Recognized EL Activities
1. Biochemistry	- BIOC2616 Directed studies in biochemistry (6) - BIOC3614 Biochemistry project (12) - BIOC3988 Biochemistry internship (6)
2. Biology 3. Biotechnology 4. Ecology & Biodiversity 5. Food & Nutritional Science 6. Microbiology	- BIOL2318 Biological Sciences Field Course (6) - BIOL2320 Directed studies in biological sciences (6) - BIOL3321 Biological sciences project (12) - BIOL3988 Biological sciences internship (6)
7. Chemistry	- CHEM2111 Directed studies in chemistry (6) - CHEM3105 Chemistry project (12) - CHEM3901 HKUtopia: Capstone Experience for Chemistry Undergraduates (6) - CHEM3988 Chemistry internship (6)
8. Earth Sciences	- EASC2301 Field camps (6) - EASC2307 Directed studies in earth sciences (6) - EASC3308 Earth sciences project (12) - EASC3988 Earth sciences internship (6)
9. Environmental Science	- ENVS2011 Directed studies in environmental science (6) - ENVS3015 Environmental science project (12) - ENVS3016 Environmental science in practice (6) The following EL courses is also available as elective: - ENVS3988 Environmental science internship (6)
10. Mathematics	- MATH2002 Mathematics seminar (6) - MATH2999 Directed studies in mathematics (6) - MATH3988 Mathematics internship (6) - MATH3999 Mathematics project (12)
11. Mathematics / Physics	- MATH2002 Mathematics seminar (6) - MATH2999 Directed studies in mathematics (6) - MATH3988 Mathematics internship (6) - MATH3999 Mathematics project (12) - PHYS2533 Directed studies in physics (6) - PHYS3531 Physics project (12) - PHYS3987 Quantitative tools in physics (0) - PHYS3988 Physics internship (6)
12. Astronomy 13. Physics	- PHYS2533 Directed studies in physics (6) - PHYS3531 Physics project (12) - PHYS3987 Quantitative tools in physics (0) - PHYS3988 Physics internship (6)
14. Risk Management 15. Statistics	- STAT2318 Directed studies in statistics (6) - STAT3319 Statistics project (12) - STAT3988 Statistics internship (6) - STAT3989 Essential IT skills for statistical and risk analysts (0)
Experiential Learning Courses / Activities Common to all Majors	<u>Exchange Study</u> - 1 year or 1 semester (1st or 2nd semester) exchange via the HKU Worldwide Exchange Programme or Science Faculty/Department Level Exchange Programmes (non-credit bearing) <u>Research-based Learning</u> - Summer Research Fellowship (organized at Faculty level) (non-credit bearing) - Overseas Research Fellowship (organized at Faculty level) (non-credit bearing) <u>Professional Preparation Programme</u> - SCNC2005 Career development for science students (non-credit bearing) - SCNC2988 Service learning internship (non-credit bearing) <u>Other Form of Experiential Learning</u> - Intensified Learning Opportunity Programme (ILOP)

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
Biology
Biotechnology
Chemistry
Earth Sciences
Ecology & Biodiversity
Environmental Science
Food & Nutritional Science
Mathematics
Mathematics/Physics
Microbiology
Physics
Risk Management
Statistics

Major Title Major in Astronomy

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
The 21st century is the golden age for astronomy as space-based telescopes are beginning 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 interest specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students would 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 also 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:
a. Students should be able to identify and describe astrophysical phenomena with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze astrophysical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Astronomy

Required courses (72 credits) (note 1)

1. Introductory level courses (18 credits)

EASC1123 Planetary geology 6
PHYS0003 Nature of the universe 6

Plus at least 6 credits of the following courses:

PHYS1414 General physics I 6
PHYS1415 General physics II 6
PHYS1417 Basic physics 6

2. Advanced level courses (48 credits)

PHYS2021 The Physical universe 6
PHYS2022 Observational astronomy 6
PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

MATH2601 Numerical analysis 6

PHYS2222 Wave and optics 6
PHYS2227 Laser & spectroscopy 6
PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2325 Theoretical physics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

PHYS2039 Principles of astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3035 Stellar atmospheres 6
PHYS3036 Interstellar medium 6
PHYS3037 Selected topics in astrophysics 6
PHYS3038 Planetary science 6
PHYS3040 Stellar physics 6

Plus at least 6 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 For students having major-major, or major-minor combinations of Astronomy-Physics, a major-major combination of Astronomy-Mathematics/Physics, a set of replacement courses from the Departments of Mathematics and Physics will be made available so that there will be no overlap with the core courses in this major.
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Astronomy
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The 21st century is the golden age for astronomy as space-based telescopes are beginning 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 interest specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students would 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 also 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:
a. Students should be able to identify and describe astrophysical phenomena with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze astrophysical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Astronomy

Required courses (72 credits) (note 1)

1. Introductory level courses (18 credits)

EASC1123 Planetary geology 6

Either
[PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 3) (3)
AND
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 3) (3)]
OR PHYS0003 Nature of the universe 6

Plus at least 6 credits of the following courses:

PHYS1414 General physics I 6
PHYS1415 General physics II 6
PHYS1417 Basic physics 6

2. Advanced level courses (48 credits)

PHYS2021 The Physical universe 6
PHYS2022 Observational astronomy 6

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

MATH2601 Numerical analysis 6
PHYS2222 Wave and optics 6
PHYS2227 Laser & spectroscopy 6
PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2325 Theoretical physics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

PHYS2039 Principles of astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3035 Stellar atmospheres 6
PHYS3036 Interstellar medium 6
PHYS3037 Selected topics in astrophysics 6
PHYS3038 Planetary science 6
PHYS3040 Stellar physics 6

Plus at least 6 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 For students having major-major, or major-minor combinations of Astronomy-Physics, a major-major combination of Astronomy-Mathematics/Physics, a set of replacement courses from the Departments of Mathematics and Physics will be made available so that there will be no overlap with the core courses in this major.
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
3 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title — Major in Astronomy

Offered to students admitted to Year 1 in — **2010-2011**

Objectives:
The 21st century is the golden age for astronomy as space-based telescopes are beginning 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 interest specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students would 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 also 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:
a. Students should be able to identify and describe astrophysical phenomena with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze astrophysical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Astronomy

Required courses (72 credits) (note 1)

1. Introductory level courses (18 credits)

EASC1123 Planetary geology 6

Either
[PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 3) (3)
AND
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 3) (3)]
OR PHYS0003 Nature of the universe 6

Plus at least 6 credits of the following courses:

PHYS1414 General physics I 6
PHYS1415 General physics II 6
PHYS1417 Basic physics 6

2. Advanced level courses (48 credits)

PHYS2021 The Physical universe 6
PHYS2022 Observational astronomy 6

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

MATH2601 Numerical analysis 6
PHYS2222 Wave and optics 6
PHYS2227 Laser & spectroscopy 6
PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2325 Theoretical physics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

PHYS2039 Principles of astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3035 Stellar atmospheres 6
PHYS3036 Interstellar medium 6
PHYS3037 Selected topics in astrophysics 6
PHYS3038 Planetary science 6
PHYS3040 Stellar physics 6

Plus at least 6 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 For students having major-major, or major-minor combinations of Astronomy-Physics, a major-major combination of Astronomy-Mathematics/Physics, a set of replacement courses from the Departments of Mathematics and Physics will be made available so that there will be no overlap with the core courses in this major.
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
3 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Astronomy
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The 21st century is the golden age for astronomy as space-based telescopes are beginning 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 interest specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students would 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 also 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:
a. Students should be able to identify and describe astrophysical phenomena with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze astrophysical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or a pass in PHYS0114 Fundamental physics I and PHYS0115 Fundamental physics II or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Astronomy

Required courses (72 credits) (note 1)

1. Introductory level courses (18 credits)

At least 6 credits of the following courses:

BIOL0602 Origins of life and astrobiology 3
PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 3) (3)
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 3) (3)
PHYS0003 Nature of the universe 6

Plus at least 6 credits of the following courses:

MATH1805 University mathematics B 6
PHYS1315 Method in physics I 6

Plus at least 6 credits of the following courses:

PHYS1414 General physics I 6
PHYS1415 General physics II 6

PHYS1417 Basic physics 6

2. Advanced level courses (48 credits)

PHYS2021 The Physical universe 6
PHYS2022 Observational astronomy 6
PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

MATH2601 Numerical analysis 6
PHYS2222 Wave and optics 6
PHYS2227 Laser & spectroscopy 6
PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2325 Theoretical physics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 12 credits of the following courses, subject to prerequisite requirements.

PHYS2039 Principles of astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3035 Stellar atmospheres 6
PHYS3036 Interstellar medium 6
PHYS3037 Selected topics in astrophysics 6
PHYS3038 Planetary science 6
PHYS3040 Stellar physics 6

Plus at least 6 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 For students having major-major, or major-minor combinations of Astronomy-Physics, a major-major combination of Astronomy-Mathematics/Physics, a set of replacement courses from the Departments of Mathematics and Physics will be made available so that there will be no overlap with the core courses in this major.
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
3 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biochemistry
Offered to students admitted to Year 1 in	**2012-2013**

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 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 to play a leading role in society in the future.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to interpret and communicate scientific data and literature using appropriate scientific language
(by means of literature-based coursework and debate)

d. Students would be able to 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)

e. Students would be able to 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)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biochemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6
CHEM1401 Fundamentals of organic chemistry 6 OR CHEM1003 Chemistry: the molecular world 6

2. Advanced level courses (48 credits)

At least 48 credits of the following courses:

BIOC2601 Metabolism 6
BIOC2602 Understanding metabolic diseases 6
BIOC2603 Principles of molecular genetics 6
BIOC2604 Essential techniques in biochemistry and molecular biology 6
BIOC3608 Sequence bioinformatics 6
BIOC3610 Advanced biochemistry I 6

BIOC3611 Advanced biochemistry II 6
BIOC3613 Molecular biology of the gene 6
BIOC3615 Advanced techniques in biochemistry & molecular biology 6
BIOL2301 Protein structure and function 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOC2616 Directed studies in biochemistry 6
- BIOC3614 Biochemistry project 12
- BIOC3988 Biochemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra- ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biochemistry course (BIOC2XXX or BIOC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biochemistry
Offered to students admitted to Year 1 in	**2011-2012**

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 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 to play a leading role in society in the future.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to interpret and communicate scientific data and literature using appropriate scientific language
(by means of literature-based coursework and debate)

d. Students would be able to 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)

e. Students would be able to 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)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biochemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6
CHEM1401 Fundamentals of organic chemistry 6 OR CHEM1003 Chemistry: the molecular world 6

2. Advanced level courses (48 credits)

At least 48 credits of the following courses:

BIOC2601 Metabolism 6
BIOC2602 Understanding metabolic diseases 6
BIOC2603 Principles of molecular genetics 6
BIOC2604 Essential techniques in biochemistry and molecular biology 6
BIOC3608 Introduction to bioinformatics OR Sequence bioinformatics 6
BIOC3610 Advanced biochemistry I 6

BIOC3611 Advanced biochemistry II 6
BIOC3613 Molecular biology of the gene 6
BIOC3615 Advanced techniques in biochemistry & molecular biology 6
BIOL2301 Protein structure and function 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOC2616 Directed studies in biochemistry 6
- BIOC3614 Biochemistry project 12
- BIOC3988 Biochemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra- ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biochemistry course (BIOC2XXX or BIOC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biochemistry
Offered to students admitted to Year 1 in	**2010-2011**

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 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 to play a leading role in society in the future.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to interpret and communicate scientific data and literature using appropriate scientific language
(by means of literature-based coursework and debate)

d. Students would be able to 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)

e. Students would be able to 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)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biochemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6
CHEM1401 Fundamentals of organic chemistry 6 OR CHEM1003 Chemistry: the molecular world 6

2. Advanced level courses (48 credits)

At least 48 credits of the following courses:

BIOC2601 Metabolism 6
BIOC2602 Understanding metabolic diseases 6
BIOC2603 Principles of molecular genetics 6
BIOC2604 Essential techniques in biochemistry and molecular biology 6
BIOC3608 Introduction to bioinformatics OR Sequence bioinformatics 6
BIOC3610 Advanced biochemistry I 6

BIOC3611 Advanced biochemistry II 6
BIOC3613 Molecular biology of the gene 6
BIOC3615 Advanced techniques in biochemistry & molecular biology 6
BIOL2301 Protein structure and function 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOC2616 Directed studies in biochemistry 6
- BIOC3614 Biochemistry project 12
- BIOC3988 Biochemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra- ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biochemistry course (BIOC2XXX or BIOC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biochemistry
Offered to students admitted to Year 1 in	**2009-2010**

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 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 to play a leading role in society in the future.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to interpret and communicate scientific data and literature using appropriate scientific language
(by means of literature-based coursework and debate)

d. Students would be able to 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)

e. Students would be able to 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)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biochemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6
CHEM1401 Fundamentals of organic chemistry 6 OR CHEM1003 Chemistry: the molecular world 6

2. Advanced level courses (48 credits)

At least 48 credits of the following courses:

BIOC2601 Metabolism 6
BIOC2602 Understanding metabolic diseases 6
BIOC2603 Principles of molecular genetics 6
BIOC2604 Essential techniques in biochemistry and molecular biology 6
BIOC3608 Introduction to bioinformatics OR Sequence bioinformatics 6
BIOC3610 Advanced biochemistry I 6

BIOC3611 Advanced biochemistry II 6
BIOC3613 Molecular biology of the gene 6
BIOC3615 Advanced techniques in biochemistry & molecular biology 6
BIOL2301 Protein structure and function 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOC2616 Directed studies in biochemistry 6
- BIOC3614 Biochemistry project 12
- BIOC3988 Biochemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra- ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biochemistry course (BIOC2XXX or BIOC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title | Major in Biology

Offered to students admitted to Year 1 in | **2012-2013**

Objectives:
The aim of this major is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology. The curriculum also places strong emphasis on experiential learning, which includes internship programs, undergraduate directed studies and research projects. Students graduate from the program should be able to meet all the requirements for higher degree in M.Phil. and Ph.D. of various disciplines in biology and biotechnology, as well as professional programs including medicine and dentistry.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

c. Students will be able to communicate (oral and written), and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of coursework and laboratory-based learning, group project and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

e. Students will be able to acquire laboratory techniques essential to engaging in experimental studies involving protein, DNA and micro-organisms.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (48 credits)

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2119 Genetics 6
BIOL2215 Animal physiology & environmental adaptation 6
BIOL2303 Molecular biology 6

Plus 18 credits of BIOL2XXX or BIOL3XXX level course

Students are recommended to take the following courses:

BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title: Major in Biology

Offered to students admitted to Year 1 in: **2011-2012**

Objectives:
The aim of this major is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology. The curriculum also places strong emphasis on experiential learning, which includes internship programs, undergraduate directed studies and research projects. Students graduate from the program should be able to meet all the requirements for higher degree in M.Phil. and Ph.D. of various disciplines in biology and biotechnology, as well as professional programs including medicine and dentistry.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

c. Students will be able to communicate (oral and written), and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of coursework and laboratory-based learning, group project and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

e. Students will be able to acquire laboratory techniques essential to engaging in experimental studies involving protein, DNA and micro-organisms.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (48 credits)

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2215 Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2303 Molecular biology 6

Plus 18 credits of BIOL2XXX or BIOL3XXX level course

Students are recommended to take the following courses:

BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Biology

Offered to students admitted to Year 1 in **2010-2011**

Objectives:
The aim of this major is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology. The curriculum also places strong emphasis on experiential learning, which includes internship programs, undergraduate directed studies and research projects. Students graduate from the program should be able to meet all the requirements for higher degree in M.Phil. and Ph.D. of various disciplines in biology and biotechnology, as well as professional programs including medicine and dentistry.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

c. Students will be able to communicate (oral and written), and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of coursework and laboratory-based learning, group project and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

e. Students will be able to acquire laboratory techniques essential to engaging in experimental studies involving protein, DNA and micro-organisms.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (48 credits)

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2215 Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2303 Molecular biology 6

Plus 18 credits of BIOL2XXX or BIOL3XXX level course

Students are recommended to take the following courses:

BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biology
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The aim of this major is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology. The curriculum also places strong emphasis on experiential learning, which includes internship programs, undergraduate directed studies and research projects. Students graduate from the program should be able to meet all the requirements for higher degree in M.Phil. and Ph.D. of various disciplines in biology and biotechnology, as well as professional programs including medicine and dentistry.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

c. Students will be able to communicate (oral and written), and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of coursework and laboratory-based learning, group project and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

e. Students will be able to acquire laboratory techniques essential to engaging in experimental studies involving protein, DNA and micro-organisms.
(by means of coursework and laboratory-based and/or research-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (48 credits)

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2215 Animal physiology OR Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2303 Molecular biology 6

Plus 18 credits of BIOL2XXX or BIOL3XXX level course

Students are recommended to take the following courses:

BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2611 Systematics & phylogenetics 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biotechnology
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Biotechnology curriculum trains students to use the advantage of biological insights and apply them to medicine, agriculture and environment. Biotechnology students will be equipped with solid background knowledge in molecular biology, biochemistry, genetics, microbiology, and cell biology. Based on further interests, they will acquire knowledge in the specialized fields of medicine, diagnostics, drug development, agriculture, aquaculture, etc., from the advanced courses. Biotechnology graduates are prepared to enter various sectors of industry and Government, including R&D, manufacturing, and sales and inspectors, or continue their education in professional programs or graduate school. The curriculum places strong emphasis on combining lecture courses with experiential learning, which includes laboratory studies, internship programs, and research projects, to enhance the student's knowledge in biotechnology, to improve their thinking and communication skills, and to apply their science knowledge to real-world situations.

Learning Outcomes:
a. Describe key concepts in molecular biology, biochemistry, genetics, microbiology, and cell biology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

b. Acquire and apply laboratory techniques essential to biotechnology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

c. Cooperate and work with other students.
(by means of coursework, research-based learning and group project in the curriculum)

d. Communicate in written and oral communication skills.
(by means of coursework, research-based learning and presentation opportunities in the curriculum)

e. Develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in the field and develop solutions.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

f. Gain insight into real-life experience in the applications of biotechnology.
(by means of coursework, laboratory-based and experiential learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biotechnology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (48 credits)

BIOL2115 Cell biology & cell technology 6
BIOL2301 Protein structure and function 6
BIOL2303 Molecular biology 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Plus at least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6

BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biotechnology
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Biotechnology curriculum trains students to use the advantage of biological insights and apply them to medicine, agriculture and environment. Biotechnology students will be equipped with solid background knowledge in molecular biology, biochemistry, genetics, microbiology, and cell biology. Based on further interests, they will acquire knowledge in the specialized fields of medicine, diagnostics, drug development, agriculture, aquaculture, etc., from the advanced courses. Biotechnology graduates are prepared to enter various sectors of industry and Government, including R&D, manufacturing, and sales and inspectors, or continue their education in professional programs or graduate school. The curriculum places strong emphasis on combining lecture courses with experiential learning, which includes laboratory studies, internship programs, and research projects, to enhance the student's knowledge in biotechnology, to improve their thinking and communication skills, and to apply their science knowledge to real-world situations.

Learning Outcomes:
a. Describe key concepts in molecular biology, biochemistry, genetics, microbiology, and cell biology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

b. Acquire and apply laboratory techniques essential to biotechnology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

c. Cooperate and work with other students.
(by means of coursework, research-based learning and group project in the curriculum)

d. Communicate in written and oral communication skills.
(by means of coursework, research-based learning and presentation opportunities in the curriculum)

e. Develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in the field and develop solutions.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

f. Gain insight into real-life experience in the applications of biotechnology.
(by means of coursework, laboratory-based and experiential learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biotechnology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (48 credits)

BIOL2115 Cell biology & cell technology 6
BIOL2301 Protein structure and function 6
BIOL2303 Molecular biology 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Plus at least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6

BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL2608 Biometrics (note 2) 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biotechnology
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Biotechnology curriculum trains students to use the advantage of biological insights and apply them to medicine, agriculture and environment. Biotechnology students will be equipped with solid background knowledge in molecular biology, biochemistry, genetics, microbiology, and cell biology. Based on further interests, they will acquire knowledge in the specialized fields of medicine, diagnostics, drug development, agriculture, aquaculture, etc., from the advanced courses. Biotechnology graduates are prepared to enter various sectors of industry and Government, including R&D, manufacturing, and sales and inspectors, or continue their education in professional programs or graduate school. The curriculum places strong emphasis on combining lecture courses with experiential learning, which includes laboratory studies, internship programs, and research projects, to enhance the student's knowledge in biotechnology, to improve their thinking and communication skills, and to apply their science knowledge to real-world situations.

Learning Outcomes:
a. Describe key concepts in molecular biology, biochemistry, genetics, microbiology, and cell biology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

b. Acquire and apply laboratory techniques essential to biotechnology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

c. Cooperate and work with other students.
(by means of coursework, research-based learning and group project in the curriculum)

d. Communicate in written and oral communication skills.
(by means of coursework, research-based learning and presentation opportunities in the curriculum)

e. Develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in the field and develop solutions.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

f. Gain insight into real-life experience in the applications of biotechnology.
(by means of coursework, laboratory-based and experiential learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biotechnology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (48 credits)

BIOL2115 Cell biology & cell technology 6
BIOL2301 Protein structure and function 6
BIOL2303 Molecular biology 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Plus at least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6

BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL2608 Biometrics (note 2) 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Biotechnology
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Biotechnology curriculum trains students to use the advantage of biological insights and apply them to medicine, agriculture and environment. Biotechnology students will be equipped with solid background knowledge in molecular biology, biochemistry, genetics, microbiology, and cell biology. Based on further interests, they will acquire knowledge in the specialized fields of medicine, diagnostics, drug development, agriculture, aquaculture, etc., from the advanced courses. Biotechnology graduates are prepared to enter various sectors of industry and Government, including R&D, manufacturing, and sales and inspectors, or continue their education in professional programs or graduate school. The curriculum places strong emphasis on combining lecture courses with experiential learning, which includes laboratory studies, internship programs, and research projects, to enhance the student's knowledge in biotechnology, to improve their thinking and communication skills, and to apply their science knowledge to real-world situations.

Learning Outcomes:
a. Describe key concepts in molecular biology, biochemistry, genetics, microbiology, and cell biology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

b. Acquire and apply laboratory techniques essential to biotechnology.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

c. Cooperate and work with other students.
(by means of coursework, research-based learning and group project in the curriculum)

d. Communicate in written and oral communication skills.
(by means of coursework, research-based learning and presentation opportunities in the curriculum)

e. Develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in the field and develop solutions.
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

f. Gain insight into real-life experience in the applications of biotechnology.
(by means of coursework, laboratory-based and experiential learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Biotechnology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (48 credits)

BIOL2115 Cell biology & cell technology 6
BIOL2301 Protein structure and function 6
BIOL2303 Molecular biology 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Plus at least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6

BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2608 Biometrics (note 2) 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Chemistry
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Chemistry curriculum at the University of Hong Kong aims to provide students with a solid training in the major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, analytical and applied chemistry. A wide selection of elective courses, for instance, food and water analysis, medicinal chemistry and computational chemistry, is also available to provide students with practical 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 Chemistry-Major programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are very crucial for their future careers in a knowledge-based economy.

Our curriculum emphasizes both theory and application. Chemical principles and concepts covered in the curriculum can be easily applied to many aspects of life, such as the collection and analysis of forensic evidence, knowledge of drugs and diseases, and the analysis and identification of hazardous substances in consumer products such as pesticide residues in vegetables and food additives. 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:
a. Students would acquire and apply knowledge in different fields of chemistry, such as physical, inorganic, organic, applied and analytical chemistry.
(by means of coursework, laboratory-based, research-based and learning activities in the curriculum)

b. Students would acquire and apply knowledge in modern chemistry laboratory operations, and receive solid hands-on experience to practise the experimental skills and use instrumentation in various fields of chemistry.
(by requiring no less than 100 hours of laboratory classes in the curriculum)

c. Students would acquire and apply major techniques in chemical synthesis, analysis, and characterization by means of chemical instrumentation.
(by means of coursework, laboratory-based and research-based learning in the curriculum)

d. Students would gain insight into the operation of local chemical industries and other chemistry careers.
(by participating in student field trip opportunities in the curriculum)

e. Students would be able to personally experience the real-life industrial or research environment, and develop their initiative and interpersonal skills
(by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories.)

Minimum Entry Requirement:
AL Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Chemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

CHEM1002 Chemistry: principles and concepts 6
CHEM1003 Chemistry: the molecular world 6
CHEM1004 Chemistry: an experimental science I 6

2. Advanced level courses (48 credits)

CHEM2202 Chemical instrumentation 6
CHEM2303 Intermediate inorganic chemistry 6
CHEM2403 Intermediate organic chemistry 6
CHEM2504 Physical chemistry I: Introduction to Quantum chemistry 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6

Plus at least 18 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level) including at least 12 credits of the following courses from two different areas (note 1):

(1) CHEM3305 Advanced Inorganic Chemistry
(2) CHEM3406 Integrated Organic Synthesis OR CHEM3404 Advanced Organic Chemistry
(3) CHEM3507 Physical Chemistry II: Statistical Thermodynamics and Kinetic Theory

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- CHEM2111 Directed studies in chemistry 6
- CHEM3105 Chemistry project 12
- CHEM3901 HKUtopia: capstone experience for chemistry undergraduates 6
- CHEM3988 Chemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level chemistry course (CHEM2XXX or CHEM3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in Analytical Chemistry: CHEM2102, CHEM2207, CHEM3204, CHEM3206.
(b) For students who are interested in Applied Chemistry: CHEM2103, CHEM3107, CHEM3110, CHEM3204.
(c) For students who are interested in Medicinal Chemistry: CHEM3404, CHEM3405, CHEM3406, CHEM3407.
(d) For students who are interested in Pure Chemistry: CHEM3106, CHEM3305, CHEM3406, CHEM3506/CHEM3507.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title — Major in Chemistry

Offered to students admitted to Year 1 in — **2011-2012**

Objectives:
The Chemistry curriculum at the University of Hong Kong aims to provide students with a solid training in the major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, analytical and applied chemistry. A wide selection of elective courses, for instance, food and water analysis, medicinal chemistry and computational chemistry, is also available to provide students with practical 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 Chemistry-Major programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are very crucial for their future careers in a knowledge-based economy.

Our curriculum emphasizes both theory and application. Chemical principles and concepts covered in the curriculum can be easily applied to many aspects of life, such as the collection and analysis of forensic evidence, knowledge of drugs and diseases, and the analysis and identification of hazardous substances in consumer products such as pesticide residues in vegetables and food additives. 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:
a. Students would acquire and apply knowledge in different fields of chemistry, such as physical, inorganic, organic, applied and analytical chemistry.
(by means of coursework, laboratory-based, research-based and learning activities in the curriculum)

b. Students would acquire and apply knowledge in modern chemistry laboratory operations, and receive solid hands-on experience to practise the experimental skills and use instrumentation in various fields of chemistry.
(by requiring no less than 100 hours of laboratory classes in the curriculum)

c. Students would acquire and apply major techniques in chemical synthesis, analysis, and characterization by means of chemical instrumentation.
(by means of coursework, laboratory-based and research-based learning in the curriculum)

d. Students would gain insight into the operation of local chemical industries and other chemistry careers.
(by participating in student field trip opportunities in the curriculum)

e. Students would be able to personally experience the real-life industrial or research environment, and develop their initiative and interpersonal skills
(by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories.)

Minimum Entry Requirement:
AL Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Chemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

CHEM1002 Chemistry: principles and concepts 6
CHEM1003 Chemistry: the molecular world 6
CHEM1004 Chemistry: an experimental science I 6

2. Advanced level courses (48 credits)

CHEM2202 Chemical instrumentation 6
CHEM2303 Intermediate inorganic chemistry 6
CHEM2403 Intermediate organic chemistry 6
CHEM2504 Physical chemistry I: Introduction to Quantum chemistry 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6

Plus at least 18 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level) including at least 12 credits of the following courses from two different areas (note 1):

(1) CHEM3305 Advanced Inorganic Chemistry
(2) CHEM3406 Integrated Organic Synthesis OR CHEM3404 Advanced Organic Chemistry
(3) CHEM3507 Physical Chemistry II: Statistical Thermodynamics and Kinetic Theory

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- CHEM2111 Directed studies in chemistry 6
- CHEM3105 Chemistry project 12
- CHEM3901 HKUtopia: capstone experience for chemistry undergraduates 6
- CHEM3988 Chemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level chemistry course (CHEM2XXX or CHEM3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in Analytical Chemistry: CHEM2102, CHEM2207, CHEM3204, CHEM3206.
(b) For students who are interested in Applied Chemistry: CHEM2103, CHEM3107, CHEM3110, CHEM3204.
(c) For students who are interested in Medicinal Chemistry: CHEM3404, CHEM3405, CHEM3406, CHEM3407.
(d) For students who are interested in Pure Chemistry: CHEM3106, CHEM3305, CHEM3406, CHEM3506/CHEM3507.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Chemistry
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Chemistry curriculum at the University of Hong Kong aims to provide students with a solid training in the major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, analytical and applied chemistry. A wide selection of elective courses, for instance, food and water analysis, medicinal chemistry and computational chemistry, is also available to provide students with practical 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 Chemistry-Major programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are very crucial for their future careers in a knowledge-based economy.

Our curriculum emphasizes both theory and application. Chemical principles and concepts covered in the curriculum can be easily applied to many aspects of life, such as the collection and analysis of forensic evidence, knowledge of drugs and diseases, and the analysis and identification of hazardous substances in consumer products such as pesticide residues in vegetables and food additives. 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:
a. Students would acquire and apply knowledge in different fields of chemistry, such as physical, inorganic, organic, applied and analytical chemistry.
(by means of coursework, laboratory-based, research-based and learning activities in the curriculum)

b. Students would acquire and apply knowledge in modern chemistry laboratory operations, and receive solid hands-on experience to practise the experimental skills and use instrumentation in various fields of chemistry.
(by requiring no less than 100 hours of laboratory classes in the curriculum)

c. Students would acquire and apply major techniques in chemical synthesis, analysis, and characterization by means of chemical instrumentation.
(by means of coursework, laboratory-based and research-based learning in the curriculum)

d. Students would gain insight into the operation of local chemical industries and other chemistry careers.
(by participating in student field trip opportunities in the curriculum)

e. Students would be able to personally experience the real-life industrial or research environment, and develop their initiative and interpersonal skills
(by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories.)

Minimum Entry Requirement:
AL Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Chemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

CHEM1002 Chemistry: principles and concepts 6
CHEM1003 Chemistry: the molecular world 6
CHEM1004 Chemistry: an experimental science I 6

2. Advanced level courses (48 credits)

CHEM2202 Chemical instrumentation 6
CHEM2303 Intermediate inorganic chemistry 6
CHEM2403 Intermediate organic chemistry 6
CHEM2504 Physical chemistry I: introduction to quantum chemistry 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6

Plus at least 18 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level) including at least 12 credits of the following courses from two different areas (notes 1 and 2):

(1) CHEM3305 Advanced Inorganic Chemistry
(2) CHEM3406 Integrated Organic Synthesis OR CHEM3404 Advanced Organic Chemistry
(3) CHEM3507 Physical Chemistry II: Statistical Thermodynamics and Kinetic Theory

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- CHEM2111 Directed studies in chemistry 6
- CHEM3105 Chemistry project 12
- CHEM3901 HKUtopia: capstone experience for chemistry undergraduates 6
- CHEM3988 Chemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level chemistry course (CHEM2XXX or CHEM3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in Analytical Chemistry: CHEM2102, CHEM2207, CHEM3204, CHEM3206.
(b) For students who are interested in Applied Chemistry: CHEM2103, CHEM3107, CHEM3110, CHEM3204.
(c) For students who are interested in Medicinal Chemistry: CHEM3404, CHEM3405, CHEM3406, CHEM3407.
(d) For students who are interested in Pure Chemistry: CHEM3106, CHEM3305, CHEM3406, CHEM3506/CHEM3507.

2 Students who have passed CHEM2402 in 2010-2011 are not allowed to take CHEM2403. These students may take CHEM3403 Integrated organic synthesis (9) as a required CHEM3XXX level course in organic 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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Chemistry
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Chemistry curriculum at the University of Hong Kong aims to provide students with a solid training in the major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, analytical and applied chemistry. A wide selection of elective courses, for instance, food and water analysis, medicinal chemistry and computational chemistry, is also available to provide students with practical 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 Chemistry-Major programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are very crucial for their future careers in a knowledge-based economy.

Our curriculum emphasizes both theory and application. Chemical principles and concepts covered in the curriculum can be easily applied to many aspects of life, such as the collection and analysis of forensic evidence, knowledge of drugs and diseases, and the analysis and identification of hazardous substances in consumer products such as pesticide residues in vegetables and food additives. 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:
a. Students would acquire and apply knowledge in different fields of chemistry, such as physical, inorganic, organic, applied and analytical chemistry.
(by means of coursework, laboratory-based, research-based and learning activities in the curriculum)

b. Students would acquire and apply knowledge in modern chemistry laboratory operations, and receive solid hands-on experience to practise the experimental skills and use instrumentation in various fields of chemistry.
(by requiring no less than 100 hours of laboratory classes in the curriculum)

c. Students would acquire and apply major techniques in chemical synthesis, analysis, and characterization by means of chemical instrumentation.
(by means of coursework, laboratory-based and research-based learning in the curriculum)

d. Students would gain insight into the operation of local chemical industries and other chemistry careers.
(by participating in student field trip opportunities in the curriculum)

e. Students would be able to personally experience the real-life industrial or research environment, and develop their initiative and interpersonal skills
(by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories.)

Minimum Entry Requirement:
AL Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Chemistry

Required courses (72 credits)

1. Introductory level courses (18 credits)

CHEM1002 Chemistry: principles and concepts 6
CHEM1003 Chemistry: the molecular world 6
CHEM1004 Chemistry: an experimental science I 6

2. Advanced level courses (48 credits)

CHEM2202 Chemical instrumentation 6
CHEM2302 Intermediate inorganic chemistry 9
CHEM2402 Intermediate organic chemistry 9
CHEM2503 Intermediate physical chemistry 9
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6

Plus at least 9 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level) of which 6 credits must be at CHEM3XXX level, subject to prerequisite requirements. (notes 1 and 2)

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- CHEM2111 Directed studies in chemistry 6
- CHEM3105 Chemistry project 12
- CHEM3901 HKUtopia: capstone experience for chemistry undergraduates 6
- CHEM3988 Chemistry internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level chemistry course (CHEM2XXX or CHEM3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in Analytical Chemistry: CHEM2102, CHEM2207, CHEM3203, CHEM3204.
(b) For students who are interested in Applied Chemistry: CHEM2103, CHEM3107, CHEM3110, CHEM3204.
(c) For students who are interested in Medicinal Chemistry: CHEM3403, CHEM3404, CHEM3405, CHEM3407.
(d) For students who are interested in Pure Chemistry: CHEM3106, CHEM3303, CHEM3403, CHEM3506/CHEM3513.

2 Students who have not completed CHEM2302, CHEM2402, and CHEM2503 by 2010-2011 may take the following new core courses as replacement. The total number of required credits of advanced courses reamins the same (48 credits):
- CHEM2303 Intermediate inorganic chemistry 6 (replaces CHEM2302)
- CHEM2403 Intermediate organic chemistry 6 (replaces CHEM2402)
- CHEM2504 Physical chemistry I: introduction to quantum chemistry 6 (replaces CHEM2503)

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Earth Sciences
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Earth Sciences curriculum at the University of Hong Kong aims to enhance students' understanding of the nature of Earth systems and Earth processes. This includes studies of the solid earth, the atmosphere, the oceans, the biosphere, and their interactions as well as impacts of human activities on Earth's natural environment. Core courses in the curriculum emphasize fundamental knowledge and skills in the Earth Sciences, while elective courses provide either training in specific Earth Science disciplines or an extension of knowledge aimed to give students the technical skills in certain specialized or applied areas including resource development, environmental management and geotechnical applications, so that they might follow a variety of career options. Throughout the curriculum there is consistent emphasis on experiential learning through fieldwork, laboratory studies, field camps, industrial training, and research-based learning, designed to enhance the students' knowledge in earth science, improve their thinking and communication skills, outlook and attitude, and increase their ability to improvise in unforeseen situations.

Learning Outcomes:
a. Students would be able to describe the key concepts in the conventional areas of the geosciences, covering the areas of earth systems, physical geology, historical geology, atmospheric system, oceanography, geochemistry, geophysics, and earth resources.
(by means of coursework and learning activities in the major or minor curriculum)

b. Students would have acquired the ability to make observation, description, measurement and analysis of common geological features and experience with geological mapping on 1:10,000 scale.
(by requiring of no less than 56 days of field work in the major)

c. Students would be able to cooperate and work with other students in an effective manner and have learned to accept and appreciate different cultures.
(by means of requiring students to attend at least one overseas field camp in which students have to live and work together for 3 weeks consecutively)

d. Students would have improved their communication skills.
(by means of frequent opportunities and occasions in major in which students have to give oral and posters presentations to a peer audience.)

e. Students would have gained some insights in the real-life industrial environment and developed connection within the geosciences profession.
(by arrangement for students internship opportunities of no less than four weeks with companies or government.)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Earth Sciences

Required courses (72 credits)

1. Introductory level courses (18 credits)

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (48 credits)

Any 48 credits of advanced-level Earth Sciences courses (note 1)

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- EASC2301 Field camps 6

- EASC2307 Directed studies in earth sciences 6
- EASC3308 Earth sciences project 12
- EASC3988 Earth sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level earth sciences course (EASC2XXX or EASC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students may optionally follow one of the following themes in Earth Sciences:

(a) Geology theme

Objective: for students interested in a career as a geologist.

EASC2108; EASC2109; EASC2113; EASC2124; EASC2125; EASC2126; plus two other advanced courses in geology (EASC2000 or EASC3000 level).

Students intending to become engineering geologists are advised to take the following courses in addition to these eight advanced level courses: EASC2004; EASC2201; EASC3202; EASC3203.

Students intending for a career in mining geology are advised to take the following course as elective: EASC3133

(b) Environmental Geology theme

Objective: for students interested in environmental geology, application of chemistry and physics to studying pollution and environmental toxicology.

EASC2112; EASC2126; EASC2127; EASC2201; EASC3133; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

(c) Atmospheric and Oceanic Studies theme

Objective: for students interested in studying the dynamics of atmospheres and oceans.
Minimum requirements: EASC2005; EASC2127; ENVS2013; EASC2129; EASC2131; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Earth Sciences
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Earth Sciences curriculum at the University of Hong Kong aims to enhance students' understanding of the nature of Earth systems and Earth processes. This includes studies of the solid earth, the atmosphere, the oceans, the biosphere, and their interactions as well as impacts of human activities on Earth's natural environment. Core courses in the curriculum emphasize fundamental knowledge and skills in the Earth Sciences, while elective courses provide either training in specific Earth Science disciplines or an extension of knowledge aimed to give students the technical skills in certain specialized or applied areas including resource development, environmental management and geotechnical applications, so that they might follow a variety of career options. Throughout the curriculum there is consistent emphasis on experiential learning through fieldwork, laboratory studies, field camps, industrial training, and research-based learning, designed to enhance the students' knowledge in earth science, improve their thinking and communication skills, outlook and attitude, and increase their ability to improvise in unforeseen situations.

Learning Outcomes:
a. Students would be able to describe the key concepts in the conventional areas of the geosciences, covering the areas of earth systems, physical geology, historical geology, atmospheric system, oceanography, geochemistry, geophysics, and earth resources.
(by means of coursework and learning activities in the major or minor curriculum)

b. Students would have acquired the ability to make observation, description, measurement and analysis of common geological features and experience with geological mapping on 1:10,000 scale.
(by requiring of no less than 56 days of field work in the major)

c. Students would be able to cooperate and work with other students in an effective manner and have learned to accept and appreciate different cultures.
(by means of requiring students to attend at least one overseas field camp in which students have to live and work together for 3 weeks consecutively)

d. Students would have improved their communication skills.
(by means of frequent opportunities and occasions in major in which students have to give oral and posters presentations to a peer audience.)

e. Students would have gained some insights in the real-life industrial environment and developed connection within the geosciences profession.
(by arrangement for students internship opportunities of no less than four weeks with companies or government.)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Earth Sciences

Required courses (72 credits)

1. Introductory level courses (18 credits)

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (48 credits)

Any 48 credits of advanced-level Earth Sciences courses (note 1)

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- EASC2301 Field camps 6

- EASC2307 Directed studies in earth sciences 6
- EASC3308 Earth sciences project 12
- EASC3988 Earth sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level earth sciences course (EASC2XXX or EASC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students may optionally follow one of the following themes in Earth Sciences:

(a) Geology theme

Objective: for students interested in a career as a geologist.

EASC2108; EASC2109; EASC2113; EASC2124; EASC2125; EASC2126; plus two other advanced courses in geology (EASC2000 or EASC3000 level).

Students intending to become engineering geologists are advised to take the following courses in addition to these eight advanced level courses: EASC2004; EASC2201; EASC3202; EASC3203.

Students intending for a career in mining geology are advised to take the following course as elective: EASC3133

(b) Environmental Geology theme

Objective: for students interested in environmental geology, application of chemistry and physics to studying pollution and environmental toxicology.

EASC2112; EASC2126; EASC2127; EASC2201; EASC3133; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

(c) Atmospheric and Oceanic Studies theme

Objective: for students interested in studying the dynamics of atmospheres and oceans.
Minimum requirements: EASC2005; EASC2127; ENVS2013; EASC2129; EASC2131; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Earth Sciences
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Earth Sciences curriculum at the University of Hong Kong aims to enhance students' understanding of the nature of Earth systems and Earth processes. This includes studies of the solid earth, the atmosphere, the oceans, the biosphere, and their interactions as well as impacts of human activities on Earth's natural environment. Core courses in the curriculum emphasize fundamental knowledge and skills in the Earth Sciences, while elective courses provide either training in specific Earth Science disciplines or an extension of knowledge aimed to give students the technical skills in certain specialized or applied areas including resource development, environmental management and geotechnical applications, so that they might follow a variety of career options. Throughout the curriculum there is consistent emphasis on experiential learning through fieldwork, laboratory studies, field camps, industrial training, and research-based learning, designed to enhance the students' knowledge in earth science, improve their thinking and communication skills, outlook and attitude, and increase their ability to improvise in unforeseen situations.

Learning Outcomes:
a. Students would be able to describe the key concepts in the conventional areas of the geosciences, covering the areas of earth systems, physical geology, historical geology, atmospheric system, oceanography, geochemistry, geophysics, and earth resources.
(by means of coursework and learning activities in the major or minor curriculum)

b. Students would have acquired the ability to make observation, description, measurement and analysis of common geological features and experience with geological mapping on 1:10,000 scale.
(by requiring of no less than 56 days of field work in the major)

c. Students would be able to cooperate and work with other students in an effective manner and have learned to accept and appreciate different cultures.
(by means of requiring students to attend at least one overseas field camp in which students have to live and work together for 3 weeks consecutively)

d. Students would have improved their communication skills.
(by means of frequent opportunities and occasions in major in which students have to give oral and posters presentations to a peer audience.)

e. Students would have gained some insights in the real-life industrial environment and developed connection within the geosciences profession.
(by arrangement for students internship opportunities of no less than four weeks with companies or government.)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Earth Sciences

Required courses (72 credits)

1. Introductory level courses (18 credits)

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (48 credits)

Any 48 credits of advanced-level Earth Sciences courses (note 1)

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- EASC2301 Field camps 6

- EASC2307 Directed studies in earth sciences 6
- EASC3308 Earth sciences project 12
- EASC3988 Earth sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level earth sciences course (EASC2XXX or EASC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students may optionally follow one of the following themes in Earth Sciences:

(a) Geology theme

Objective: for students interested in a career as a geologist.

EASC2108; EASC2109; EASC2113; EASC2124; EASC2125; EASC2126; plus two other advanced courses in geology (EASC2000 or EASC3000 level).

Students intending to become engineering geologists are advised to take the following courses in addition to these eight advanced level courses: EASC2004; EASC2201; EASC3202; EASC3203.

Students intending for a career in mining geology are advised to take the following course as elective: EASC3133

(b) Environmental Geology theme

Objective: for students interested in environmental geology, application of chemistry and physics to studying pollution and environmental toxicology.

EASC2112; EASC2126; EASC2127; EASC2130; EASC2201; EASC3133; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

(c) Atmospheric and Oceanic Studies theme

Objective: for students interested in studying the dynamics of atmospheres and oceans.
Minimum requirements: EASC2005; EASC2127; EASC2128; EASC2129; EASC2130; EASC2131; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Earth Sciences
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Earth Sciences curriculum at the University of Hong Kong aims to enhance students' understanding of the nature of Earth systems and Earth processes. This includes studies of the solid earth, the atmosphere, the oceans, the biosphere, and their interactions as well as impacts of human activities on Earth's natural environment. Core courses in the curriculum emphasize fundamental knowledge and skills in the Earth Sciences, while elective courses provide either training in specific Earth Science disciplines or an extension of knowledge aimed to give students the technical skills in certain specialized or applied areas including resource development, environmental management and geotechnical applications, so that they might follow a variety of career options. Throughout the curriculum there is consistent emphasis on experiential learning through fieldwork, laboratory studies, field camps, industrial training, and research-based learning, designed to enhance the students' knowledge in earth science, improve their thinking and communication skills, outlook and attitude, and increase their ability to improvise in unforeseen situations.

Learning Outcomes:
a. Students would be able to describe the key concepts in the conventional areas of the geosciences, covering the areas of earth systems, physical geology, historical geology, atmospheric system, oceanography, geochemistry, geophysics, and earth resources.
(by means of coursework and learning activities in the major or minor curriculum)

b. Students would have acquired the ability to make observation, description, measurement and analysis of common geological features and experience with geological mapping on 1:10,000 scale.
(by requiring of no less than 56 days of field work in the major)

c. Students would be able to cooperate and work with other students in an effective manner and have learned to accept and appreciate different cultures.
(by means of requiring students to attend at least one overseas field camp in which students have to live and work together for 3 weeks consecutively)

d. Students would have improved their communication skills.
(by means of frequent opportunities and occasions in major in which students have to give oral and posters presentations to a peer audience.)

e. Students would have gained some insights in the real-life industrial environment and developed connection within the geosciences profession.
(by arrangement for students internship opportunities of no less than three weeks with companies or government.)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Earth Sciences

Required courses (72 credits)

1. Introductory level courses (18 credits)

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (48 credits)

Any 48 credits of advanced-level Earth Sciences courses (note 1)

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- EASC2301 Field camps 6

- EASC2307 Directed studies in earth sciences 6
- EASC3308 Earth sciences project 12
- EASC3988 Earth sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level earth sciences course (EASC2XXX or EASC3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students may optionally follow one of the following themes in Earth Sciences:

(a) Geology theme

Objective: for students demanding an education in the principles and practice of geology. The curriculum is designed to prepare students to become a practicing geologist.

EASC2108; EASC2109; EASC2113; EASC2124; EASC2125; EASC2126; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

Students intending for a career in engineering geology are advised to take the following courses as electives: EASC2004; EASC2201; EASC3202; EASC3203

Students intending for a career in mining geology are advised to take the following course as elective: EASC3133

(b) Environmental Geology theme

Objective: for students interested in environmental geology, application of chemistry and physics to studying pollution and environmental toxicology.

EASC2112; EASC2126; EASC2127; EASC2130; EASC2201; EASC3133; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

(c) Atmospheric and Oceanic Studies theme

Objective: for students interested in studying the dynamics of atmospheres and oceans.
Minimum requirements: EASC2005; EASC2127; EASC2128; EASC2129; EASC2130; EASC2131; plus any 12 credits advanced level Earth Sciences courses (EASC2000 or EASC3000 level)

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2012-2013**

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 a first year-core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. The second and third year of the major teaches students about the ecology and biodiversity of different ecosystems (e.g. marine 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 of biodiversity scientists or conservation biologists.

Learning Outcomes:
a. 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)
b. understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, and become equipped to understand, study, manage and protect that diversity;
(by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
c. 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)
d. are able to 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)
e. 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)
f. 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)
g. are motivated and sufficiently equipped to be able to apply the knowledge solve local, regional and global environmental problems.
(by means of coursework, laboratory-based, tutorial classes, experiential learning and/or project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Ecology & Biodiversity

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6
BIOL1608 Biostatistics 6

2. Advanced level courses (48 credits)

BIOL2611 Systematics & phylogenetics 6

BIOL2612 Conservation ecology 6

Plus at least 36 credits of the following courses (note 1):

BIOL2210 Evolution 6
BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2610 Marine biology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL2625 Animal behaviour 6
BIOL3621 Fisheries and mariculture 6
BIOL3622 Ecological impact assessment 6
BIOL3626 Conservation in practice 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in ecology & evolution: BIOL2210, BIOL2606, BIOL2615, BIOL2617, BIOL2619, BIOL2621.
(b) For students who are interested in marine biology: BIOL2607, BIOL2610, BIOL2617, BIOL2622, BIOL3621.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2011-2012**

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 a first year-core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. The second and third year of the major teaches students about the ecology and biodiversity of different ecosystems (e.g. marine 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 of biodiversity scientists or conservation biologists.

Learning Outcomes:
a. 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)
b. understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, and become equipped to understand, study, manage and protect that diversity;
(by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
c. 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)
d. are able to 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)
e. 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)
f. 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)
g. are motivated and sufficiently equipped to be able to apply the knowledge solve local, regional and global environmental problems.
(by means of coursework, laboratory-based, tutorial classes, experiential learning and/or project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Ecology & Biodiversity

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6

2. Advanced level courses (48 credits)

BIOL2608 Biometrics 6 (note 2)

BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation ecology 6

Plus at least 30 credits of the following courses (note 1):

BIOL2210 Evolution 6
BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL2625 Animal behaviour 6
BIOL3621 Fisheries and mariculture 6
BIOL3622 Ecological impact assessment 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in ecology & evolution: BIOL2210, BIOL2606, BIOL2615, BIOL2617, BIOL2619, BIOL2621.
(b) For students who are interested in marine biology: BIOL2607, BIOL2610, BIOL2617, BIOL2622, BIOL3621.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2010-2011**

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 a first year-core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. The second and third year of the major teaches students about the ecology and biodiversity of different ecosystems (e.g. marine 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 of biodiversity scientists or conservation biologists.

Learning Outcomes:
a. 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)
b. understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, and become equipped to understand, study, manage and protect that diversity;
(by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
c. 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)
d. are able to 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)
e. 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)
f. 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)
g. are motivated and sufficiently equipped to be able to apply the knowledge solve local, regional and global environmental problems.
(by means of coursework, laboratory-based, tutorial classes, experiential learning and/or project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Ecology & Biodiversity

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6

2. Advanced level courses (48 credits)

BIOL2608 Biometrics 6 (note 2)

BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation ecology 6

Plus at least 30 credits of the following courses (note 1):

BIOL2210 Evolution 6
BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL2625 Animal behaviour 6
BIOL3621 Fisheries and mariculture 6
BIOL3622 Ecological impact assessment 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in ecology & evolution: BIOL2210, BIOL2606, BIOL2615, BIOL2617, BIOL2619, BIOL2621.
(b) For students who are interested in marine biology: BIOL2607, BIOL2610, BIOL2617, BIOL2622, BIOL3621.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
This major is directed at teaching students about the 'rules of existence' for organisms in nature. 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. Considerable emphasis is placed on the use of IT and student centred learning through the Learning Support Centre of the Division of Ecology & Biodiversity. This major is based around a first year-core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. The second and third year of the major teaches students about the ecology and biodiversity of different ecosystems (e.g. marine 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. In addition, students can conduct either a small research project or produce a dissertation under the close supervision of individual staff members. 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 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 of biodiversity scientists or conservation biologists.

Learning Outcomes:
a. understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify of the 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)

b. understand and appreciate the variety of life in Hong Kong's natural habitats, and equipped to understand, study, manage and protect that diversity;
(by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)

c. have sufficient experience of the basic techniques of modern ecological science to prepare to learn new ones for specific tasks;
(by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)

d. are able to 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)

e. demonstrate of 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)

f. have the skill and knowledge to pursue postgraduate ecological research or to develop their careers 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)

g. are motivated and sufficiently equipped to be able to apply the knowledge solve local, regional and global environmental problems.
(by means of coursework, laboratory-based, tutorial classes, experiential learning and/or project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Ecology & Biodiversity

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0601 Ecology of Hong Kong (note 3) (3) OR BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0605 Ecology field course (note 3) 3
BIOL0625 Ecology and evolution 6

The following introductory courses are recommended as electives:
BIOL0126 Fundamentals of biology 6
BIOL1133 Biological sciences laboratory course 6
CHEM1009 Basic chemistry 6
EASC0105 Earth through time 6

2. Advanced level courses (48 credits)

BIOL2608 Biometrics 6 (note 2)
BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation biology OR Conservation ecology 6

Plus at least 30 credits of the following courses (note 1):

BIOL2210 Evolution 6
BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2615 Freshwater ecology 6
BIOL2616 Plant structure and evolution (note 3) (3) OR BIOL2621 Plant structure and evolution 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL3621 Fisheries and mariculture 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in ecology & evolution: BIOL2210, BIOL2606, BIOL2615, BIOL2616/BIOL2621, BIOL2617, BIOL2619.
(b) For students who are interested in marine biology: BIOL2607, BIOL2610, BIOL2617, BIOL3621.
2. Not available in 2012-2013 or thereafter.
3. Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Environmental Science
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Environmental Science curriculum in the Faculty of 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:
a. Knowledge to identify and describe the nature, and context of key issues in environmental science;
(by means of lectures, coursework, and tutorial classes in the curriculum)

b. Knowledge to use and to critically analyze a range of forms and sources of environmental data;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

c. Skills to observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

d. Advanced level of ability in scientific inquiry and effective communications.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Nil

Required courses (78 credits)

1. Introductory level courses (24 credits)

ENVS0001 Introduction to environmental science 6

Plus 18 credits of the following courses:

ENVS1002 Environmental life science OR BIOL0126 Fundamentals of biology 6
CHEM0008 Fundamental chemistry OR CHEM1009 Basic chemistry 6
EASC0118 Blue planet 6
PHYS0625 Physics by inquiry OR PHYS1417 Basic physics 6

2. Advanced level courses (48 credits) (note 1)

To meet the interdisciplinary objectives of the Environmental Science major and foster the development of transferable skills, students must take a minimum of two courses from 3 of the following 4 key areas. The key areas that are suggested in order to help prepare students for potential career pathways.

Area 1: Life and Environment

This area includes courses on Earth's ecological environment and biological resources.

BIOL2606 Environmental microbiology 6
BIOL2610 Marine biology 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6

BIOL2617 Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL3621 Fisheries and mariculture 6
ENVS2003 Demographic principles in ecology and evolution 6
ENVS2012 Global change ecology 6
ENVS3013 Ecological demography in changing environments 6

Area 2: Physical and Sustainable Environment

This area includes courses related to the Earth's physical environment, climatic changes, and energy, water and mineral resources.

EASC2113 Sedimentology 6
EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6
EASC3132 Earth resources 6
ENVS2007 Natural hazards and mitigation 6
ENVS2010 Sustainable energy and environment 6
ENVS2013 Environmental Oceanography 6

Area 3: Pollution and Remediation

This area includes courses related to the chemical environment, anthropogenic hazards, air and water quality and waste management.

BIOL2614 Environmental toxicology 6
CHEM2102 Environmental chemistry 6
CHEM2103 Chemical process industries and analysis 6
CHEM2202 Chemical instrumentation 6
CHEM2207 Food and water analysis 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6
ENVS2006 Environmental radiation 6
ENVS2008 Pollution 6
ENVS2009 Remediation 6

Area 4: Monitoring and Management

This area includes courses that deal with data and risk analysis, modeling, environmental planning and policies.

BIOL3622 Ecological impact assessment 6
ENVS2004 Environment and society 6
ENVS3014 Environmental risk assessment and management 6
MATH2408 Computational methods and differential equations with applications 6
STAT2311 Computer-aided data analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

ENVS2011 Directed studies in environmental science 6
ENVS3015 Environmental science project 12
ENVS3016 Environmental science in practice 6

Other experiential learning courses/activities are also available as electives:

- ENVS3988 Environmental science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Availability of the advanced level courses is subject to change.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Environmental Science
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Environmental Science curriculum in the Faculty of 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:
a. Knowledge to identify and describe the nature, and context of key issues in environmental science;
(by means of lectures, coursework, and tutorial classes in the curriculum)

b. Knowledge to use and to critically analyze a range of forms and sources of environmental data;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

c. Skills to observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

d. Advanced level of ability in scientific inquiry and effective communications.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Nil

Required courses (78 credits)

1. Introductory level courses (24 credits)

ENVS0001 Introduction to environmental science 6

Plus 18 credits of the following courses:

ENVS1002 Environmental life science OR BIOL0126 Fundamentals of biology 6
CHEM0008 Fundamental chemistry OR CHEM1009 Basic chemistry 6
EASC0118 Blue planet 6
PHYS0625 Physics by inquiry OR PHYS1417 Basic physics 6

2. Advanced level courses (48 credits) (note 1)

To meet the interdisciplinary objectives of the Environmental Science major and foster the development of transferable skills, students must take a minimum of two courses from 3 of the following 4 key areas. The key areas that are suggested in order to help prepare students for potential career pathways.

Area 1: Life and Environment

This area includes courses on Earth's ecological environment and biological resources.

BIOL2606 Environmental microbiology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6

BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL3621 Fisheries and mariculture 6
ENVS2003 Demographic principles in ecology and evolution OR Demographic principles in population and evolutionary biology 6
ENVS2012 Global change ecology 6
ENVS3013 Ecological demography in changing environments 6

Area 2: Physical and Sustainable Environment

This area includes courses related to the Earth's physical environment, climatic changes, and energy, water and mineral resources.

EASC2113 Sedimentology 6
EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6
EASC3132 Earth resources 6
ENVS2007 Natural hazards and mitigation 6
ENVS2010 Sustainable energy and environment 6
ENVS2013 Environmental Oceanography 6

Area 3: Pollution and Remediation

This area includes courses related to the chemical environment, anthropogenic hazards, air and water quality and waste management.

BIOL2614 Environmental toxicology 6
CHEM2102 Environmental chemistry 6
CHEM2103 Chemical process industries and analysis 6
CHEM2202 Chemical instrumentation 6
CHEM2207 Food and water analysis 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6
ENVS2006 Environmental radiation 6
ENVS2008 Pollution 6
ENVS2009 Remediation 6

Area 4: Monitoring and Management

This area includes courses that deal with data and risk analysis, modeling, environmental planning and policies.

BIOL2608 Biometrics (note 2) 6
BIOL3622 Ecological impact assessment 6
ENVS2004 Environment and society 6
ENVS3014 Environmental risk assessment and management 6
MATH2408 Computational methods and differential equations with applications 6
STAT2311 Computer-aided data analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

ENVS2011 Directed studies in environmental science 6
ENVS3015 Environmental science project 12
ENVS3016 Environmental science in practice 6

Other experiential learning courses/activities are also available as electives:

- ENVS3988 Environmental science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

1. Availability of the advanced level courses is subject to change.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Environmental Science
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Environmental Science curriculum in the Faculty of 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:
a. Knowledge to identify and describe the nature, and context of key issues in environmental science;
(by means of lectures, coursework, and tutorial classes in the curriculum)

b. Knowledge to use and to critically analyze a range of forms and sources of environmental data;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

c. Skills to observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

d. Advanced level of ability in scientific inquiry and effective communications.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Nil

Required courses (78 credits)

1. Introductory level courses (24 credits)

ENVS0001 Introduction to environmental science 6

Plus 18 credits of the following courses:

ENVS1002 Environmental life science OR BIOL0126 Fundamentals of biology 6
CHEM0008 Fundamental chemistry OR CHEM1009 Basic chemistry 6
EASC0118 Blue planet 6
PHYS0625 Physics by inquiry OR PHYS1417 Basic physics 6

2. Advanced level courses (48 credits) (note 1)

To meet the interdisciplinary objectives of the Environmental Science major and foster the development of transferable skills, students must take a minimum of two courses from 3 of the following 4 key areas. The key areas that are suggested in order to help prepare students for potential career pathways.

Area 1: Life and Environment

This area includes courses on Earth's ecological environment and biological resources.

BIOL2606 Environmental microbiology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6

BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL3621 Fisheries and mariculture 6
ENVS2003 Demographic principles in ecology and evolution OR Demographic principles in population and evolutionary biology 6
ENVS2012 Global change ecology 6
ENVS3013 Ecological demography in changing environments 6

Area 2: Physical and Sustainable Environment

This area includes courses related to the Earth's physical environment, climatic changes, and energy, water and mineral resources.

EASC2113 Sedimentology 6
EASC2127 Global change: anthropogenic impact 6
EASC2129 Physical oceanography 6 (note 2) OR ENVS2013 Environmental oceanography 6
EASC2131 A cool world: ice ages and climate change 6
EASC3132 Earth resources 6
ENVS2007 Natural hazards and mitigation 6
ENVS2010 Sustainable energy and environment 6

Area 3: Pollution and Remediation

This area includes courses related to the chemical environment, anthropogenic hazards, air and water quality and waste management.

BIOL2614 Environmental toxicology 6
CHEM2102 Environmental chemistry 6
CHEM2103 Chemical process industries and analysis 6
CHEM2202 Chemical instrumentation 6
CHEM2207 Food and water analysis 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6
ENVS2006 Environmental radiation 6
ENVS2008 Pollution 6
ENVS2009 Remediation 6

Area 4: Monitoring and Management

This area includes courses that deal with data and risk analysis, modeling, environmental planning and policies.

BIOL2608 Biometrics (note 3) 6
BIOL3622 Ecological impact assessment 6
EASC2130 Earth observation and remote sensing 6
ENVS2004 Environment and society 6
ENVS3012 Business, economics and the environment 6
ENVS3014 Environmental risk assessment and management 6
MATH2408 Computational methods and differential equations with applications 6
MATH2901 Operations research I 6
STAT2311 Computer-aided data analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

ENVS2011 Directed studies in environmental science 6
ENVS3015 Environmental science project 12
ENVS3016 Environmental science in practice 6

Other experiential learning courses/activities are also available as electives:

- ENVS3988 Environmental science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Availability of the advanced level courses is subject to change.
2. Not available in 2011-2012 or thereafter.
3. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Environmental Science
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Environmental Science curriculum in the Faculty of 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:
a. Knowledge to identify and describe the nature, and context of key issues in environmental science;
(by means of lectures, coursework, and tutorial classes in the curriculum)

b. Knowledge to use and to critically analyze a range of forms and sources of environmental data;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

c. Skills to observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments;
(by means of lectures, coursework and laboratory-based learning in the curriculum)

d. Advanced level of ability in scientific inquiry and effective communications.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Nil

Required courses (78 credits)

1. Introductory level courses (24 credits)

ENVS0001 Introduction to environmental science 6

Plus 18 credits of the following courses:

ENVS1002 Environmental life science OR BIOL0126 Fundamentals of biology 6
CHEM0008 Fundamental chemistry OR CHEM1009 Basic chemistry 6
EASC0118 Blue planet 6
PHYS0625 Physics by inquiry OR PHYS1417 Basic physics 6

2. Advanced level courses (48 credits) (note 1)

To meet the interdisciplinary objectives of the Environmental Science major and foster the development of transferable skills, students must take a minimum of two courses from 3 of the following 4 key areas. The key areas that are suggested in order to help prepare students for potential career pathways.

Area 1: Life and Environment

This area includes courses on Earth's ecological environment and biological resources.

BIOL2606 Environmental microbiology 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6

BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL3621 Fisheries and mariculture 6
ENVS2003 Demographic principles in ecology and evolution OR Demographic principles in population and evolutionary biology 6
ENVS2012 Global change ecology 6
ENVS3013 Ecological demography in changing environments 6

Area 2: Physical and Sustainable Environment

This area includes courses related to the Earth's physical environment, climatic changes, and energy, water and mineral resources.

EASC2113 Sedimentology 6
EASC2127 Global change: anthropogenic impact 6
EASC2129 Physical oceanography 6 (note 2) OR ENVS2013 Environmental oceanography 6
EASC2131 A cool world: ice ages and climate change 6
EASC3132 Earth resources 6
ENVS2007 Natural hazards and mitigation 6
ENVS2010 Sustainable energy and environment 6

Area 3: Pollution and Remediation

This area includes courses related to the chemical environment, anthropogenic hazards, air and water quality and waste management.

BIOL2614 Environmental toxicology 6
CHEM2102 Environmental chemistry 6
CHEM2103 Chemical process industries and analysis 6
CHEM2202 Chemical instrumentation 6
CHEM2207 Food and water analysis 6
CHEM2510 Principles and applications of spectroscopic and analytical techniques 6
ENVS2006 Environmental radiation 6
ENVS2008 Pollution 6
ENVS2009 Remediation 6

Area 4: Monitoring and Management

This area includes courses that deal with data and risk analysis, modeling, environmental planning and policies.

BIOL2608 Biometrics (note 3) 6
BIOL3622 Ecological impact assessment 6
EASC2130 Earth observation and remote sensing 6
ENVS2004 Environment and society 6
ENVS3012 Business, economics and the environment 6
ENVS3014 Environmental risk assessment and management 6
MATH2408 Computational methods and differential equations with applications 6
MATH2901 Operations research I 6
STAT2311 Computer-aided data analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

ENVS2011 Directed studies in environmental science 6
ENVS3015 Environmental science project 12
ENVS3016 Environmental science in practice 6

Other experiential learning courses/activities are also available as electives:

- ENVS3988 Environmental science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Availability of the advanced level courses is subject to change.
2. Not available in 2011-2012 or thereafter.
3. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title | Major in Food & Nutritional Science

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
Objectives : The Food and Nutritional Science Major at the University of Hong Kong 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) A detailed critical knowledge and understanding of the theoretical and practical aspects of food science and technology and nutrition and their relationship to human health.
(b) A 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 M.Phil 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 program 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, designed to enhance the student's 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 majoring in this program 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:
a. 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)

b. Discuss 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)

c. 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)

d. 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)

e. 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)

f. Demonstrate teamwork skills necessary to working in a multi-disciplinary environment.
(by means of coursework and group-project learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Food & Nutritional Science

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1125 Introduction to biochemistry OR CHEM1401 Fundamentals of organic chemistry 6
BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

Alternative course possible in the case of students taking Majors / Minors with an overlap of core courses:

BIOL1122 Functional biology 6

2. Advanced level courses (48 credits) (note 1)

BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6

Plus at least 36 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2538 Nutraceuticals and functional foods
BIOL2540 Food and nutritional toxicology 6
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behaviour 6
PBSL2229 Exercise physiology 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists:
(a) Food Science and Technology: BIOL2302, BIOL2503, BIOL2507, BIOL2515, BIOL2535, BIOL2536, BIOL3527, BIOL3538.
(b) Nutrition and Health Science: BIOL2218, BIOL2540, BIOL2530, BIOL2532, BIOL2533, BIOL2534, BIOL2536, BIOL3540, PBSL2229.
(c) Food Safety and Toxicology: BIOL2218, BIOL2515, BIOL2540, BIOL2536, BIOL3527.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
Objectives : The Food and Nutritional Science Major at the University of Hong Kong 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) A detailed critical knowledge and understanding of the theoretical and practical aspects of food science and technology and nutrition and their relationship to human health.
(b) A 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 M.Phil 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 program 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, designed to enhance the student's 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 majoring in this program 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:
a. 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)

b. Discuss 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)

c. 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)

d. 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)

e. 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)

f. Demonstrate teamwork skills necessary to working in a multi-disciplinary environment.
(by means of coursework and group-project learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Food & Nutritional Science

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1125 Introduction to biochemistry OR CHEM1401 Fundamentals of organic chemistry 6
BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

Alternative course possible in the case of students taking Majors / Minors with an overlap of core courses:

BIOL1122 Functional biology 6

2. Advanced level courses (48 credits) (note 1)

At least 12 credits of the following courses:

BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2537 Laboratory in nutritional science 6
BIOL3541 Advances in food toxicology 6

Plus at least 36 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2538 Nutraceuticals and functional foods
BIOL2540 Basics of Toxicology OR Food and nutritional toxicology 6
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behaviour 6
PBSL2229 Exercise physiology 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists:
(a) Food Science and Technology: BIOL2302, BIOL2503, BIOL2507, BIOL2515, BIOL2535, BIOL2536, BIOL3527, BIOL3538, BIOL3541.
(b) Nutrition and Health Science: BIOL2218, BIOL2540, BIOL2530, BIOL2531, BIOL2532, BIOL2533, BIOL2534, BIOL2536, BIOL2537, BIOL3540, PBSL2229.
(c) Food Safety and Toxicology: BIOL2218, BIOL2515, BIOL2540, BIOL2536, BIOL3527, BIOL3541.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
Objectives : The Food and Nutritional Science Major at the University of Hong Kong 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) A detailed critical knowledge and understanding of the theoretical and practical aspects of food science and technology and nutrition and their relationship to human health.
(b) A 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 M.Phil 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 program 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, designed to enhance the student's 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 majoring in this program 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:
a. 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)

b. Discuss 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)

c. 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)

d. 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)

e. 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)

f. Demonstrate teamwork skills necessary to working in a multi-disciplinary environment.
(by means of coursework and group-project learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Food & Nutritional Science

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1125 Introduction to biochemistry OR CHEM1401 Fundamentals of organic chemistry 6
BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

Alternative course possible in the case of students taking Majors / Minors with an overlap of core courses:

BIOL1122 Functional biology 6

2. Advanced level courses (48 credits) (note 1)

At least 12 credits of the following courses:

BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2537 Laboratory in nutritional science 6
BIOL3541 Advances in Food Toxicology

Plus at least 36 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2529 Food and nutritional toxicology OR BIOL2540 Basics of Toxicology OR Food and nutritional toxicology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2538 Nutraceuticals and functional foods
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behaviour 6
PBSL2229 Exercise physiology 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists:
(a) Food Science and Technology: BIOL2302, BIOL2503, BIOL2507, BIOL2515, BIOL2535, BIOL2536, BIOL3527, BIOL3538, BIOL3539 OR BIOL3541.
(b) Nutrition and Health Science: BIOL2218, BIOL2529 OR BIOL2540, BIOL2530, BIOL2531, BIOL2532, BIOL2533, BIOL2534, BIOL2536, BIOL2537, BIOL3540, PBSL2229.
(c) Food Safety and Toxicology: BIOL2218, BIOL2515, BIOL2529 OR BIOL2540, BIOL2536, BIOL3527, BIOL3539 OR BIOL3541.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title — Major in Food & Nutritional Science

Offered to students admitted to Year 1 in — **2009-2010**

Objectives:
Objectives : The Food and Nutritional Science Major at the University of Hong Kong 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) A detailed critical knowledge and understanding of the theoretical and practical aspects of food science and technology and nutrition and their relationship to human health.
(b) A 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 M.Phil 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 program 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, designed to enhance the student's 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 majoring in this program 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:
a. 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)

b. Discuss 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)

c. 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)

d. 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)

e. 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)

f. Demonstrate teamwork skills necessary to working in a multi-disciplinary environment.
(by means of coursework and group-project learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Food & Nutritional Science

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL1125 Introduction to biochemistry OR CHEM1401 Fundamentals of organic chemistry 6
BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

Alternative courses possible in the case of students taking Majors / Minors with an overlap of core courses:

BIOL0002 Introduction to food and nutritional science (note 2) 3
BIOL1122 Functional biology 6
(these courses are also strongly recommended as electives)

2. Advanced level courses (48 credits) (note 1)

At least 12 credits of the following courses:

BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2537 Laboratory in nutritional science 6
BIOL3539 Food safety and toxicology laboratory course (note 3) OR BIOL3541 Advances in Food Toxicology 6

Plus at least 36 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2529 Food and nutritional toxicology OR BIOL2540 Basics of toxicology OR Food and nutritional toxicology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2538 Nutraceuticals and functional foods
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behaviour 6
PBSL2229 Exercise physiology 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological sciences internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who wish to specialize in a certain area are recommended to choose courses from the following lists:
(a) Food Science and Technology: BIOL2302, BIOL2503, BIOL2507, BIOL2515, BIOL2535, BIOL2536, BIOL3527, BIOL3538, BIOL3539 OR BIOL3541.
(b) Nutrition and Health Science: BIOL2218, BIOL2529 OR BIOL2540, BIOL2530, BIOL2531, BIOL2532, BIOL2533, BIOL2534, BIOL2536, BIOL2537, BIOL3540, PBSL2229.
(c) Food Safety and Toxicology: BIOL2218, BIOL2515, BIOL2529 OR BIOL2540, BIOL2536, BIOL3527, BIOL3539 OR BIOL3541.
2 Not available in 2010-2011 or thereafter.
3 Not available in 2011-2012 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Mathematics Major provides the 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. 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 diverse variety of courses, 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, etc.

Learning Outcomes:
a. Students should be able to describe and present fundamental concepts in mathematics.
(by means of coursework and learning activities in the major or minor curriculum)

b. Student should be able to apply mathematical theory and techniques to different areas of Sciences.
(by means of coursework and learning activities in the major or minor curriculum)

c. Students should be able to communicate in mathematical language and present scientific arguments.
(by means of coursework, seminars, guided studies and projects.)

d. Students should be able to collaborate and work with other students in an effective manner.
(by means of guided studies, projects and seminars)

e. Students should be able to appreciate the beauty and power of mathematics.
(by means of guided studies, projects and seminars)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Mathematics

Required courses (72 credits)

1. Introductory level courses (18 credits)

MATH1001 Fundamental concepts of mathematics 6
MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6

2. Advanced level courses (48 credits)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2401 Analysis I 6
MATH2403 Functions of a complex variable 6

Plus at least 24 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), at least 12 credits of which should be from MATH3XXX or MATH6XXX level (note 2).

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 3) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics course (MATH2XXX or MATH3XXX or MATH6XXX level). Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1. Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in pure mathematics: MATH2303, MATH2304, MATH2402, MATH2403, MATH3302, MATH3404, MATH3501.
(b) For students who are interested in computational mathematics, logistics, and/or operations research: MATH2303, MATH2600, MATH2601, MATH2603, MATH2901, MATH2904, MATH2905, MATH3602, MATH3902, MATH3903.
(c) For students who are interested in economics and finance, and plan to take some professional examinations in related fields: MATH2906, MATH2907, and non-mathematics courses BUSI1002, FINA1001, FINA2802, ECON0701, ECON2101, ECON2102.
3. MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Mathematics Major provides the 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. 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 diverse variety of courses, 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, etc.

Learning Outcomes:
a. Students should be able to describe and present fundamental concepts in mathematics.
(by means of coursework and learning activities in the major or minor curriculum)

b Student should be able to apply mathematical theory and techniques to different areas of Sciences.
(by means of coursework and learning activities in the major or minor curriculum)

c. Students should be able to communicate in mathematical language and present scientific arguments.
(by means of coursework, seminars, guided studies and projects.)

d. Students should be able to collaborate and work with other students in an effective manner.
(by means of guided studies, projects and seminars)

e. Students should be able to appreciate the beauty and power of mathematics.
(by means of guided studies, projects and seminars)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Mathematics

Required courses (72 credits)

1. Introductory level courses (18 credits)

MATH1001 Fundamental concepts of mathematics 6
MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6

2. Advanced level courses (48 credits)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2401 Analysis I 6

Plus at least 18 credits of the following courses (note 2):

MATH2304 Introduction to number theory 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6
MATH2600 Discrete mathematics 6
MATH2601 Numerical analysis 6
MATH2603 Probability theory 6

MATH2901 Operational research I 6
MATH2904 Introduction to optimization 6
MATH2911 Game theory and strategy 6

Plus at least 12 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 3) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics course (MATH2XXX or MATH3XXX or MATH6XXX level). Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in pure mathematics: MATH2303, MATH2304, MATH2402, MATH2403, MATH3302, MATH3404, MATH3501.
(b) For students who are interested in computational mathematics, logistics, and/or operations research: MATH2303, MATH2600, MATH2601, MATH2603, MATH2901, MATH2904, MATH2905, MATH3602, MATH3902, MATH3903.
(c) For students who are interested in economics and finance, and plan to take some professional examinations in related fields: MATH2906, MATH2907, and non-mathematics courses BUSI1002, FINA1001, FINA2802, ECON0701, ECON2101, ECON2102.
3 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Mathematics Major provides the 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. 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 diverse variety of courses, 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, etc.

Learning Outcomes:
a. Students should be able to describe and present fundamental concepts in mathematics.
(by means of coursework and learning activities in the major or minor curriculum)

b Student should be able to apply mathematical theory and techniques to different areas of Sciences.
(by means of coursework and learning activities in the major or minor curriculum)

c. Students should be able to communicate in mathematical language and present scientific arguments.
(by means of coursework, seminars, guided studies and projects.)

d. Students should be able to collaborate and work with other students in an effective manner.
(by means of guided studies, projects and seminars)

e. Students should be able to appreciate the beauty and power of mathematics.
(by means of guided studies, projects and seminars)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Mathematics

Required courses (72 credits)

1. Introductory level courses (18 credits)

MATH1001 Fundamental concepts of mathematics 6
MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6

2. Advanced level courses (48 credits)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2401 Analysis I 6

Plus at least 18 credits of the following courses (note 2):

MATH2304 Introduction to number theory 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6
MATH2600 Discrete mathematics 6
MATH2601 Numerical analysis 6
MATH2603 Probability theory 6

MATH2901 Operational research I 6
MATH2904 Introduction to optimization 6
MATH2911 Game theory and strategy 6

Plus at least 12 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 3) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics course (MATH2XXX or MATH3XXX or MATH6XXX level). Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in pure mathematics: MATH2303, MATH2304, MATH2402, MATH2403, MATH3302, MATH3404, MATH3501.
(b) For students who are interested in computational mathematics, logistics, and/or operations research: MATH2303, MATH2600, MATH2601, MATH2603, MATH2901, MATH2904, MATH2905, MATH3602, MATH3902, MATH3903.
(c) For students who are interested in economics and finance, and plan to take some professional examinations in related fields: MATH2906, MATH2907, and non-mathematics courses BUSI1002, FINA1001, FINA2802, ECON0701, ECON2101, ECON2102.
3 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Mathematics

Offered to students admitted to Year 1 in **2009-2010**

Objectives:
The Mathematics Major provides the 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. 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 diverse variety of courses, 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, etc.

Learning Outcomes:
a. Students should be able to describe and present fundamental concepts in mathematics.
(by means of coursework and learning activities in the major or minor curriculum)

b Student should be able to apply mathematical theory and techniques to different areas of Sciences.
(by means of coursework and learning activities in the major or minor curriculum)

c. Students should be able to communicate in mathematical language and present scientific arguments.
(by means of coursework, seminars, guided studies and projects.)

d. Students should be able to collaborate and work with other students in an effective manner.
(by means of guided studies, projects and seminars)

e. Students should be able to appreciate the beauty and power of mathematics.
(by means of guided studies, projects and seminars)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Mathematics

Required courses (72 credits)

1. Introductory level courses (18 credits)

MATH1001 Fundamental concepts of mathematics 6
MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6

2. Advanced level courses (48 credits)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2401 Analysis I 6

Plus at least 18 credits of the following courses (note 2):

MATH2304 Introduction to number theory 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6
MATH2600 Discrete mathematics 6
MATH2601 Numerical analysis 6
MATH2603 Probability theory 6

MATH2901 Operational research I 6
MATH2904 Introduction to optimization 6
MATH2911 Game theory and strategy 6

Plus at least 12 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 3) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics course (MATH2XXX or MATH3XXX or MATH6XXX level). Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students who wish to specialize in a certain area are recommended to choose courses from the following lists.
(a) For students who are interested in pure mathematics: MATH2303, MATH2304, MATH2402, MATH2403, MATH3302, MATH3404, MATH3501.
(b) For students who are interested in computational mathematics, logistics, and/or operations research: MATH2303, MATH2600, MATH2601, MATH2603, MATH2901, MATH2904, MATH2905, MATH3602, MATH3902, MATH3903.
(c) For students who are interested in economics and finance, and plan to take some professional examinations in related fields: MATH2906, MATH2907, and non-mathematics courses BUSI1002, FINA1001, FINA2802, ECON0701, ECON2101, ECON2102.
3 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics/Physics
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Major in Mathematics/Physics is aimed to provide students with a solid foundation in both the subjects of 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 emphases experiential learning through internships, field studies and research projects with experts and peers, etc. With the comprehensive training received, graduates are expected to be well-prepared to go on further studies and to pursue careers in many fields of science and engineering.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with a rigorous representation using their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
(note 1)
1. AL / AS Physics or AL Engineering Science; and
2. HKCEE Additional Mathematics and AS Mathematics and Statistics, or AL Pure Mathematics; or
3. or a pass in PHYS0625 Physics by inquiry or equivalent and pass in MATH0201 Basic calculus (for those with HKCEE only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics; Physics
Minor in Mathematics; Physics

Required courses (78 credits) (note 2)

1. Introductory level courses (24 credits) (note 3)

MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (48 credits) (note 4)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2626 Introductory classical mechanics 6
PHYS2627 Introductory quantum physics (note 5) 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 6) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics / physics course (MATH2XXX or MATH3XXX or MATH6XXX or PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students would have already satisfied requirements from Blocks A and B with this curriculum.
3 Students are recommended to take also MATH1001.
4 Students who intend to pursue further studies in Mathematics/Physics are recommended to take also MATH2401, MATH3501, PHYS3331, and PHYS3332.
5 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
6 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics/Physics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Major in Mathematics/Physics is aimed to provide students with a solid foundation in both the subjects of 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 emphases experiential learning through internships, field studies and research projects with experts and peers, etc. With the comprehensive training received, graduates are expected to be well-prepared to go on further studies and to pursue careers in many fields of science and engineering.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with a rigorous representation using their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
(note 1)
1. AL / AS Physics or AL Engineering Science; and
2. HKCEE Additional Mathematics and AS Mathematics and Statistics, or AL Pure Mathematics; or
3. or a pass in PHYS0625 Physics by inquiry or equivalent and pass in MATH0201 Basic calculus (for those with HKCEE only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics; Physics
Minor in Mathematics; Physics

Required courses (78 credits) (note 2)

1. Introductory level courses (24 credits) (note 3)

MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (48 credits) (note 4)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2626 Introductory classical mechanics 6
PHYS2627 Introductory quantum physics (note 5) 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 6) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics / physics course (MATH2XXX or MATH3XXX or MATH6XXX or PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students would have already satisfied requirements from Blocks A and B with this curriculum.
3 Students are recommended to take also MATH1001.
4 Students who intend to pursue further studies in Mathematics/Physics are recommended to take also MATH2401, MATH3501, PHYS3331, and PHYS3332.
5 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
6 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Mathematics/Physics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Major in Mathematics/Physics is aimed to provide students with a solid foundation in both the subjects of 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 emphases experiential learning through internships, field studies and research projects with experts and peers, etc. With the comprehensive training received, graduates are expected to be well-prepared to go on further studies and to pursue careers in many fields of science and engineering.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with a rigorous representation using their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
(note 1)
1. AL / AS Physics or AL Engineering Science; and
2. HKCEE Additional Mathematics and AS Mathematics and Statistics, or AL Pure Mathematics; or
3. or a pass in PHYS0625 Physics by inquiry or equivalent and pass in MATH0201 Basic calculus (for those with HKCEE only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics; Physics
Minor in Mathematics; Physics

Required courses (78 credits) (note 2)

1. Introductory level courses (24 credits) (note 3)

MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (48 credits) (note 4)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2403 Functions of a complex variable 6
MATH2405 Differential equations 6

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2626 Introductory classical mechanics 6
PHYS2627 Introductory quantum physics (note 5) 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 6) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics / physics course (MATH2XXX or MATH3XXX or MATH6XXX or PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students would have already satisfied requirements from Blocks A and B with this curriculum.
3 Students are recommended to take also MATH1001.
4 Students who intend to pursue further studies in Mathematics/Physics are recommended to take also MATH2401, MATH3501, PHYS3331, and PHYS3332.
5 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
6 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title: Major in Mathematics/Physics

Offered to students admitted to Year 1 in: **2009-2010**

Objectives:
The Major in Mathematics/Physics is aimed to provide students with a solid foundation in both the subjects of 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 emphases experiential learning through internships, field studies and research projects with experts and peers, etc. With the comprehensive training received, graduates are expected to be well-prepared to go on further studies and to pursue careers in many fields of science and engineering.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with a rigorous representation using their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
(note 1)
1. AL / AS Physics or AL Engineering Science; and
2. HKCEE Additional Mathematics and AS Mathematics and Statistics, or AL Pure Mathematics; or
3. a pass in PHYS0114 Fundamental physics I and PHYS0115 Fundamental physics II or a pass in PHYS0625 Physics by inquiry or equivalent and pass in MATH0201 Basic calculus (for those with HKCEE only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
78 credits (24 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics; Physics
Minor in Mathematics; Physics

Required courses (78 credits) (note 2)

1. Introductory level courses (24 credits) (note 3)

MATH1111 Linear algebra 6
MATH1211 Multivariable calculus 6
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (48 credits) (note 4)

MATH2201 Introduction to mathematical analysis 6
MATH2301 Algebra I 6
MATH2403 Functions of a complex variable 6

MATH2405 Differential equations 6
PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2626 Introductory classical mechanics 6
PHYS2627 Introductory quantum physics (note 5) 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- MATH2002 Mathematics seminar (note 6) 6
- MATH2999 Directed studies in mathematics 6
- MATH3988 Mathematics internship 6
- MATH3999 Mathematics project 12
- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level mathematics / physics course (MATH2XXX or MATH3XXX or MATH6XXX or PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students would have already satisfied requirements from Blocks A and B with this curriculum.
3 Students are recommended to take also MATH1001.
4 Students who intend to pursue further studies in Mathematics/Physics are recommended to take also MATH2401, MATH3501, PHYS3331, and PHYS3332.
5 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.
6 MATH2002 is for first year BSc students only.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Microbiology

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
The aim of this major is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe the key concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

e. Students will gain an insight into the professional work of scientists and have exposure to potential employers during project work or placement.
(achieved through experiential learning)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Microbiology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (48 credits)

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 24 credits of the following courses:

BIOL2302 Fermentation technology 6

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6
BIOL3325 Molecular phylogenetics and evolution 6
ENVS2009 Remediation 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Microbiology
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The aim of this major is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe the key concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

e. Students will gain an insight into the professional work of scientists and have exposure to potential employers during project work or placement.
(achieved through experiential learning)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Microbiology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (48 credits)

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 24 credits of the following courses:

BIOL2302 Fermentation technology 6

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6
BIOL3325 Molecular phylogenetics and evolution 6
BIOL3624 Environmental monitoring and remediation techniques 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title | Major in Microbiology

Offered to students admitted to Year 1 in | **2010-2011**

Objectives:
The aim of this major is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe the key concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

e. Students will gain an insight into the professional work of scientists and have exposure to potential employers during project work or placement.
(achieved through experiential learning)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Microbiology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (48 credits)

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 24 credits of the following courses:

BIOL2302 Fermentation technology 6

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6
BIOL3325 Molecular phylogenetics and evolution 6
BIOL3624 Environmental monitoring and remediation techniques 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Microbiology
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The aim of this major is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe the key concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

e. Students will gain an insight into the professional work of scientists and have exposure to potential employers during project work or placement.
(achieved through experiential learning)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Microbiology

Required courses (72 credits)

1. Introductory level courses (18 credits)

BIOL0129 Introductory microbiology (note 1) (3) OR BIOL0135 Introductory microbiology 6
BIOL0131 Basic medical microbiology (note 1) 3
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (48 credits)

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 24 credits of the following courses:

BIOL2302 Fermentation technology 6
BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6
BIOL3325 Molecular phylogenetics and evolution 6
BIOL3624 Environmental monitoring and remediation techniques 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- BIOL2318 Biological sciences field course 6
- BIOL2320 Directed studies in biological sciences 6
- BIOL3321 Biological sciences project 12
- BIOL3988 Biological science internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level biological sciences course (BIOL2XXX or BIOL3XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Physics

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
The Major in Physics is aimed to provide students a solid foundation on the subject. It covers a wide range of core courses which form the blocks of fundamental knowledge to learn specialization, 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 would 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 for work in their specialized area.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
1. AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or
2. a pass in PHYS0625 Physics by inquiry;
or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Physics

Required courses (72 credits)

1. Introductory level courses (18 credits)

PHYS1414 General physics I 6
PHYS1415 General physics II 6

Plus at least 6 credits of introductory level Physics courses (PHYS0XXX or PHYS1XXX level), subject to prerequisite requirements.

2. Advanced level courses (48 credits) (note 1)

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses:

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 30 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who intend to pursue further studies in Physics are recommended to take also PHYS3331 and PHYS3332
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Physics

Offered to students admitted to Year 1 in **2011-2012**

Objectives:
The Major in Physics is aimed to provide students a solid foundation on the subject. It covers a wide range of core courses which form the blocks of fundamental knowledge to learn specialization, 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 would 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 for work in their specialized area.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
1. AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or
2. a pass in PHYS0625 Physics by inquiry;
or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Physics

Required courses (72 credits)

1. Introductory level courses (18 credits)

PHYS1414 General physics I 6
PHYS1415 General physics II 6

Plus at least 6 credits of introductory level Physics courses (PHYS0XXX or PHYS1XXX level), subject to prerequisite requirements.

2. Advanced level courses (48 credits) (note 1)

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses:

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 30 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who intend to pursue further studies in Physics are recommended to take also PHYS3331 and PHYS3332
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title: Major in Physics

Offered to students admitted to Year 1 in: **2010-2011**

Objectives:
The Major in Physics is aimed to provide students a solid foundation on the subject. It covers a wide range of core courses which form the blocks of fundamental knowledge to learn specialization, 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 would 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 for work in their specialized area.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
1. AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or
2. a pass in PHYS0625 Physics by inquiry;
or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Physics

Required courses (72 credits)

1. Introductory level courses (18 credits)

PHYS1414 General physics I 6
PHYS1415 General physics II 6

Plus at least 6 credits of introductory level Physics courses (PHYS0XXX or PHYS1XXX level), subject to prerequisite requirements.

2. Advanced level courses (48 credits) (note 1)

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses:

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 30 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who intend to pursue further studies in Physics are recommended to take also PHYS3331 and PHYS3332
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title Major in Physics

Offered to students admitted to Year 1 in **2009-2010**

Objectives:
The Major in Physics is aimed to provide students a solid foundation on the subject. It covers a wide range of core courses which form the blocks of fundamental knowledge to learn specialization, 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 would 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 for work in their specialized area.

Learning Outcomes:
a. Students should be able to identify and describe physical systems with their professional knowledge.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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)

c. Students should be able to analyze problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and research-based projects in the curriculum)

d. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

e. Students should be able to 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.)

Minimum Entry Requirement:
1. AL / AS Physics or AL Engineering Science; and HKCEE Additional Mathematics or AS Mathematics and Statistics or AL Pure Mathematics; or
2. A pass in PHYS0114 Fundamental physics I and PHYS0115 Fundamental physics II or a pass in PHYS0625 Physics by inquiry;
or equivalent

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Physics

Required courses (72 credits)

1. Introductory level courses (18 credits)

PHYS1414 General physics I 6
PHYS1415 General physics II 6

Plus at least 6 credits of introductory level Physics courses (PHYS0XXX or PHYS1XXX level), subject to prerequisite requirements.

2. Advanced level courses (48 credits) (note 1)

PHYS2627 Introductory quantum physics (note 2) 6

Plus at least 12 credits of the following courses:

PHYS2321 Introductory electromagnetism 6
PHYS2322 Statistical mechanics and thermodynamics 6
PHYS2323 Introductory quantum mechanics 6
PHYS2626 Introductory classical mechanics 6

Plus at least 30 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- PHYS2533 Directed studies in physics 6
- PHYS3531 Physics project 12
- PHYS3987 Quantitative tools in physics (non-credit bearing)
- PHYS3988 Physics internship 6
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level physics course (PHYS2XXX or PHYS3XXX or PHYS6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Students who intend to pursue further studies in Physics are recommended to take also PHYS3331 and PHYS3332
2 Students may consider taking PHYS2627 as early as possible to allow for maximum flexibility in course selection for advanced level courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title | Major in Risk Management

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
The Risk Management curriculum at the University of Hong Kong aims to provide students with the skills and expertise to enable them to acquire the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other 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:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to critically evaluate and make effective use of models and techniques for risk assessment and management.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

d. Students would be able to 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)

e. Students would gain insights into current advances in risk management through either project or industrial training.
(by means of coursework, tutorial classes, project-based and/or experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Risk Management

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1303 Data management 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT2309 The statistics of investment risk 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any from the list below

Plus at least 24 credits of the following courses:

STAT2303 Probability modelling 6
STAT2310 Risk management and insurance 6
STAT2312 Data mining 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3323 Current topics in risk management 6
STAT3821 Financial economics II 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Risk Management
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Risk Management curriculum at the University of Hong Kong aims to provide students with the skills and expertise to enable them to acquire the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other 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 discrete-time models in finance, stochastic calculus with financial applications, and financial time series modeling. Through participating in experiential learning activities including research-based projects, industrial internships and overseas exchanges, students could enhance their knowledge in risk management and exposure in managing risk in practice, and improve their thinking and communication skills.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to critically evaluate and make effective use of models and techniques for risk assessment and management.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

d. Students would be able to 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)

e. Students would gain insights into current advances in risk management through either project or industrial training.
(by means of coursework, tutorial classes, project-based and/or experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Risk Management

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the

Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT2309 The statistics of investment risk 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any from the list below

Plus at least 24 credits of the following courses:

STAT2303 Probability modelling 6
STAT2310 Risk management and insurance 6
STAT2312 Data mining 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3323 Current topics in risk management 6
STAT3821 Financial economics II 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Risk Management
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Risk Management curriculum at the University of Hong Kong aims to provide students with the skills and expertise to enable them to acquire the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other 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 discrete-time models in finance, stochastic calculus with financial applications, and financial time series modeling. Through participating in experiential learning activities including research-based projects, industrial internships and overseas exchanges, students could enhance their knowledge in risk management and exposure in managing risk in practice, and improve their thinking and communication skills.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to critically evaluate and make effective use of models and techniques for risk assessment and management.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

d. Students would be able to 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)

e. Students would gain insights into current advances in risk management through either project or industrial training.
(by means of coursework, tutorial classes, project-based and/or experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Risk Management

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the

Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT2309 The statistics of investment risk 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any from the list below

Plus at least 24 credits of the following courses:

STAT2303 Probability modelling 6
STAT2310 Risk management and insurance 6
STAT2312 Data mining 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance/Risk management and Basel II in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3821 Financial economics II 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title — Major in Risk Management

Offered to students admitted to Year 1 in — **2009-2010**

Objectives:
The Risk Management curriculum at the University of Hong Kong aims to provide students with the skills and expertise to enable them to acquire the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other 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 discrete-time models in finance, stochastic calculus with financial applications, and financial time series modeling. Through participating in experiential learning activities including research-based projects, industrial internships and overseas exchanges, students could enhance their knowledge in risk management and exposure in managing risk in practice, and improve their thinking and communication skills.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to critically evaluate and make effective use of models and techniques for risk assessment and management.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

d. Students would be able to 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)

e. Students would gain insights into current advances in risk management through either project or industrial training.
(by means of coursework, tutorial classes, project-based and/or experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH0211 Basic applicable mathematics

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Statistics
Minor in Risk Management; Statistics

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT2309 The statistics of investment risk 6

STAT3301 Time-series analysis 6
STAT2320 (note 1) / STAT3320 Risk management and Basel Accords in banking and finance/Risk management and Basel II in banking and finance 6

Plus at least 24 credits of the following courses:

STAT2303 Probability modelling 6
STAT2310 Risk management and insurance 6
STAT2312 Data mining 6
STAT2315 Practical mathematics for investment 6
STAT2812 Financial economics I 6
STAT3308 Financial engineering (note 1) OR STAT3303 Derivatives and risk management 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3821 Financial economics II 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title — Major in Statistics

Offered to students admitted to Year 1 in — **2012-2013**

Objectives:
The Major in Statistics curriculum centres on the study of statistics, a scientific discipline characterized by the development and applications of analytic and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytic and computational skills, which are in great demand in practical areas where data are obtained for the purpose of finding information in support of decision making. It establishes for 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:
a. Students would 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)

b. Students would be able to 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.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

c. Equipped with hands-on experience in data analysis using commercial statistical software, students would 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)

d. Students would 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)

e. Through the understanding and application of statistical concepts and techniques, students would 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 experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Statistics

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1303 Data management 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT2316 Advanced SAS programming 6
STAT3301 Time-series analysis 6
STAT3302 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:

STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6

List B:

STAT2305 Quality control and Management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT2317 Sample survey methods 6
STAT3306 Selected topics in statistics 6
STAT3811 Survival analysis 6
Any 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level), subject to the Department's approval 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Statistics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Major in Statistics curriculum centres on the study of statistics, a scientific discipline characterized by the development and applications of analytic and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytic and computational skills, which are in great demand in practical areas where data are obtained for the purpose of finding information in support of decision making. It establishes for 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:
a. Students would 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)

b. Students would be able to 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.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

c. Equipped with hands-on experience in data analysis using commercial statistical software, students would 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)

d. Students would 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)

e. Through the understanding and application of statistical concepts and techniques, students would 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 experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Statistics

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6

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

List A:

STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6

List B:

STAT2305 Quality control and Management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT3306 Selected topics in statistics 6
STAT3811 Survival analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title	Major in Statistics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Major in Statistics curriculum centres on the study of statistics, a scientific discipline characterized by the development and applications of analytic and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytic and computational skills, which are in great demand in practical areas where data are obtained for the purpose of finding information in support of decision making. It establishes for 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:
a. Students would 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)

b. Students would be able to 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.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

c. Equipped with hands-on experience in data analysis using commercial statistical software, students would 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)

d. Students would 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)

e. Through the understanding and application of statistical concepts and techniques, students would 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 experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH1804 University mathematics A, or MATH0211 Basic applicable mathematics with grade B- or above

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Minor in Statistics

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses:
Any 6-credit advanced level statistics course (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6

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

List A:

STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6

List B:

STAT2305 Quality control and Management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT3306 Selected topics in statistics 6
STAT3811 Survival analysis 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Major Title | Major in Statistics

Offered to students admitted to Year 1 in | **2009-2010**

Objectives:
The Major in Statistics curriculum centres on the study of statistics, a scientific discipline characterized by the development and applications of analytic and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytic and computational skills, which are in great demand in practical areas where data are obtained for the purpose of finding information in support of decision making. It establishes for 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:
a. Students would 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)

b. Students would be able to 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.
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)

c. Equipped with hands-on experience in data analysis using commercial statistical software, students would 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)

d. Students would 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)

e. Through the understanding and application of statistical concepts and techniques, students would 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 experiential learning in the curriculum)

Minimum Entry Requirement:
A pass in AL Pure Mathematics or equivalent, or MATH0211 Basic applicable mathematics

Minimum Credit Requirement:
72 credits (18 credits introductory level, 54 credits advanced level courses including experiential learning requirement)

Impermissible Combination:
Major in Risk Management
Minor in Risk Management; Statistics

Required courses (72 credits)

1. Introductory level courses (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6

Plus at least 6 credits of the following courses:

STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6
STAT1323 Introduction to demographic and socio-economic statistics 6

2. Advanced level courses (48 credits)

STAT2301 Linear statistical analysis 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6

Plus at least 24 credits from Lists A and B, among which at least 12 credits from List A:

List A:

STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2308 Statistical genetics 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT3306 Selected topics in statistics 6
STAT3308 Financial engineering (note 1) OR STAT3303 Derivatives and risk management 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6
STAT3322 Market risk analysis 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

List B:

STAT2304 Design and analysis of experiments 6
STAT2305 Quality control and Management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2315 Practical mathematics for investment 6
STAT2320 (note 1) / STAT3320 Risk management and Basel II in banking and finance 6
STAT2801 Life contingencies 6
STAT2805 Credibility theory and loss distributions 6
STAT2812 Financial economics I 6
STAT3810 Risk theory 6

3. Experiential learning requirement (6 credits) *

Students must take at least one of the following forms of extra-ordinary learning experience to fulfill the experiential learning requirement:

- STAT2318 Directed studies in statistics 6
- STAT3319 Statistics project 12
- STAT3988 Statistics internship 6
- STAT3989 Essential IT skills for statistical and risk analysts (non-credit bearing)
- SCNC2005 Career development for science students (non-credit bearing)
- SCNC2988 Service learning internship (non-credit bearing)
- Exchange study via HKU Worldwide or Science Faculty/Department Level (1st sem/2nd sem/1 yr) (non-credit bearing)
- Any other activities determined by the Faculty to conform to the spirit of experiential learning experience (non-credit bearing)

* If the extra-ordinary learning experience is fulfilled by non-credit bearing activities, students must take an additional 6-credit advanced level statistics course (STAT2XXX or STAT3XXX or STAT6XXX level).
Students are not required to take EL if this Science major is taken as a second major but a 6-credit advanced level course in the second major must be taken to fulfill the credit requirement.

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

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
Biology
Biotechnology
Chemistry
Earth Sciences
Ecology & Biodiversity
Food & Nutritional Science
General Science [1]
Global Climate Change
Mathematics
Microbiology
Physics
Risk Management
Statistics

Notes: [1] General Science minor is only available for students outside the Faculty of Science

Minor Title	Minor in Actuarial Studies
Offered to students admitted to Year 1 in	**2012-2013**

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 interest in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

Learning Outcomes:
a. to 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)

b. to 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)

Minimum Entry Requirement:
AL Pure Mathematics or AS Mathematics and Statistics or equivalent

Minimum Credit Requirement:
36-42 credits (12-18 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil

Required courses (36 or 42 credits)

1. Introductory level courses (12 or 18 credits)

For students majoring in Risk Management or Statistics (12 credits)

STAT1323 Introduction to demographic and socio-economic statistics 6
STAT2303 Probability modelling 6
STAT2306 Business logistics 6
STAT2315 Practical mathematics for investment 6

For students minoring in Risk Management or Statistics (12 credits)

STAT1302 Probability and statistics II 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

For students not belonging to the above two categories (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1801 Probability and statistics: foundations of actuarial science 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2801 Life contingencies 6
STAT2805 Credibility theory and loss distributions 6
STAT2807 Corporate finance for actuarial science 6
STAT2812 Financial economics I 6
STAT3810 Risk theory 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Actuarial Studies
Offered to students admitted to Year 1 in	**2011-2012**

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 interest in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

Learning Outcomes:
a. to 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)

b. to 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)

Minimum Entry Requirement:
AL Pure Mathematics or AS Mathematics and Statistics or equivalent

Minimum Credit Requirement:
36-42 credits (12-18 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil

Required courses (36 or 42 credits)

1. Introductory level courses (12 or 18 credits)

For students majoring in Risk Management or Statistics (12 credits)

STAT1323 Introduction to demographic and socio-economic statistics 6
STAT2303 Probability modelling 6
STAT2306 Business logistics 6
STAT2315 Practical mathematics for investment 6

For students minoring in Risk Management or Statistics (12 credits)

STAT1302 Probability and statistics II 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

For students not belonging to the above two categories (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1801 Probability and statistics: foundations of actuarial science 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2801 Life contingencies 6
STAT2805 Credibility theory and loss distributions 6
STAT2807 Corporate finance for actuarial science 6
STAT2812 Financial economics I 6
STAT3810 Risk theory 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Actuarial Studies
Offered to students admitted to Year 1 in	**2010-2011**

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 interest in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

Learning Outcomes:
a. to 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)

b. to 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)

Minimum Entry Requirement:
AL Pure Mathematics or AS Mathematics and Statistics or equivalent

Minimum Credit Requirement:
36-42 credits (12-18 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil

Required courses (36 or 42 credits)

1. Introductory level courses (12 or 18 credits)

For students majoring in Risk Management or Statistics (12 credits)

STAT1323 Introduction to demographic and socio-economic statistics 6
STAT2303 Probability modelling 6
STAT2306 Business logistics 6
STAT2315 Practical mathematics for investment 6

For students minoring in Risk Management or Statistics (12 credits)

STAT1302 Probability and statistics II 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

For students not belonging to the above two categories (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1801 Probability and statistics: foundations of actuarial science 6
STAT2303 Probability modelling 6
STAT2315 Practical mathematics for investment 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2801 Life contingencies 6
STAT2805 Credibility theory and loss distributions 6
STAT2807 Corporate finance for actuarial science 6
STAT2812 Financial economics I 6
STAT3810 Risk theory 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Actuarial Studies
Offered to students admitted to Year 1 in	**2009-2010**

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 interest in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

Learning Outcomes:
a. to 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)

b. to 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)

Minimum Entry Requirement:
AL Pure Mathematics or AS Mathematics and Statistics or equivalent

Minimum Credit Requirement:
36-42 credits (12-18 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil

Required courses (36 or 42 credits)

1. Introductory level courses (12 or 18 credits)

For students majoring in Risk Management or Statistics (12 credits)

STAT1323 Introduction to demographic and socio-economic statistics 6
STAT1802 Financial mathematics 6
STAT2303 Probability modelling 6
STAT2306 Business logistics 6

For students minoring in Risk Management or Statistics (12 credits)

STAT1302 Probability and statistics II 6
STAT1801 Probability and statistics: foundations of actuarial science 6
STAT1802 Financial mathematics 6
STAT2303 Probability modelling 6

For students not belonging to the above two categories (18 credits)

STAT1301 Probability and statistics I 6
STAT1302 Probability and statistics II 6
STAT1801 Probability and statistics: foundations of actuarial science 6
STAT1802 Financial mathematics 6
STAT2303 Probability modelling 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2801 Life contingencies 6
STAT2805 Credibility theory and loss distributions 6
STAT2807 Corporate finance for actuarial science 6
STAT2812 Financial economics I 6
STAT3810 Risk theory 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Astronomy
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Minor in Astronomy is intended to provide interested students 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 interest in the subject and to establish connections between the field of astronomy and other science disciplines.

Learning Outcomes:
a. Students should be able to identify and describe astrophysical phenomena with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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 opportunities of field activities in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced levelcourses)

Impermissible Combination:
Major in Astronomy

Required courses (36 credits) (note 1)

1. Introductory level courses (12 credits)

PHYS0003 Nature of the universe 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 2 & 3)

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX) level, out of which at least 12 credits are of the following courses:

PHYS2021 The physical universe 6
PHYS2022 Observational astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3040 Stellar physics 6

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 For students having major/minor combination of Physics / Astronomy, or Materials Science / Astronomy, any single introductory or advanced level Physics course can be used to satisfy a major or minor requirement only once.
2 Students without AL/AS Physics are strongly advised to take PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses. Students without HKCEE Physics are strongly advised to take PHYS0114 and PHYS0115 and PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses.
3 Students are advised to take at least one of the following courses: PHYS1414, PHYS1415, or PHYS1417 toallow for maximum flexibility in selection for advanced level Physics courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title Minor in Astronomy

Offered to students admitted to Year 1 in **2011-2012**

Objectives:
The Minor in Astronomy is intended to provide interested students 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 interest in the subject and to establish connections between the field of astronomy and other science disciplines.

Learning Outcomes:
a. Students should be able to identify and describe astrophysical phenomena with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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 opportunities of field activities in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced levelcourses)

Impermissible Combination:
Major in Astronomy

Required courses (36 credits) (note 1)

1. Introductory level courses (12 credits)

Either
[PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 4) (3) AND
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 4) (3)]
OR PHYS0003 Nature of the universe 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 2 & 3)

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX) level, out of which at least 12 credits are of the following courses:

PHYS2021 The physical universe 6
PHYS2022 Observational astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3040 Stellar physics 6

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 For students having major/minor combination of Physics / Astronomy, or Materials Science / Astronomy, any single introductory or advanced level Physics course can be used to satisfy a major or minor requirement only once.
2 Students without AL/AS Physics are strongly advised to take PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses. Students without HKCEE Physics are strongly advised to take PHYS0114 and PHYS0115 and PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses.
3 Students are advised to take at least one of the following courses: PHYS1414, PHYS1415, or PHYS1417 toallow for maximum flexibility in selection for advanced level Physics courses.
4 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title — Minor in Astronomy

Offered to students admitted to Year 1 in — **2010-2011**

Objectives:
The Minor in Astronomy is intended to provide interested students 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 interest in the subject and to establish connections between the field of astronomy and other science disciplines.

Learning Outcomes:
a. Students should be able to identify and describe astrophysical phenomena with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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 opportunities of field activities in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced levelcourses)

Impermissible Combination:
Major in Astronomy

Required courses (36 credits) (note 1)

1. Introductory level courses (12 credits)

Either
[PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 4) (3) AND
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 4) (3)]
OR PHYS0003 Nature of the universe 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 2 & 3)

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX) level, out of which at least 12 credits are of the following courses:

PHYS2021 The physical universe 6
PHYS2022 Observational astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3040 Stellar physics 6

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 For students having major/minor combination of Physics / Astronomy, or Materials Science / Astronomy, any single introductory or advanced level Physics course can be used to satisfy a major or minor requirement only once.
2 Students without AL/AS Physics are strongly advised to take PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses. Students without HKCEE Physics are strongly advised to take PHYS0114 and PHYS0115 and PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses.
3 Students are advised to take at least one of the following courses: PHYS1414, PHYS1415, or PHYS1417 toallow for maximum flexibility in selection for advanced level Physics courses.
4 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title Minor in Astronomy

Offered to students admitted to Year 1 in **2009-2010**

Objectives:
The Minor in Astronomy is intended to provide interested students 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 interest in the subject and to establish connections between the field of astronomy and other science disciplines.

Learning Outcomes:
a. Students should be able to identify and describe astrophysical phenomena with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should 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 opportunities of field activities in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced levelcourses)

Impermissible Combination:
Major in Astronomy

Required courses (36 credits) (note 1)

1. Introductory level courses (12 credits)

Either
[PHYS0001 Nature of the universe I: introduction to observational astronomy and the solar system (note 4) (3) AND
PHYS0002 Nature of the universe II: stars, galaxies and cosmology for beginners (note 4) (3)]
OR PHYS0003 Nature of the universe 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 2 & 3)

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX) level, out of which at least 12 credits are of the following courses:

PHYS2021 The physical universe 6
PHYS2022 Observational astronomy 6
PHYS3031 Astrophysics 6
PHYS3033 General relativity 6
PHYS3034 Cosmology 6
PHYS3040 Stellar physics 6

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 For students having major/minor combination of Physics / Astronomy, or Materials Science / Astronomy, any single introductory or advanced level Physics course can be used to satisfy a major or minor requirement only once.
2 Students without AL/AS Physics are strongly advised to take PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses. Students without HKCEE Physics are strongly advised to take PHYS0114 and PHYS0115 and PHYS1417 to allow for maximum flexibility in selection of advanced level Physics courses.
3 Students are advised to take at least one of the following courses: PHYS1414, PHYS1415, or PHYS1417 toallow for maximum flexibility in selection for advanced level Physics courses.
4 Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biochemistry
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Minor in Biochemistry offered by the Department of 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 selects courses that will compliment the individual student's Major.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to 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)

Minimum Entry Requirement:
AL Biology or AS Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biochemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6

2. Advanced level courses (24 credits)

BIOL2301 Protein structure and function 6

Plus at least 6 credits of BIOC2XXX level courses and at least 12 credits of BIOC3XXX level courses, subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biochemistry
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Minor in Biochemistry offered by the Department of 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 selects courses that will compliment the individual student's Major.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to 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)

Minimum Entry Requirement:
AL Biology or AS Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biochemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6

2. Advanced level courses (24 credits)

BIOL2301 Protein structure and function 6

Plus at least 6 credits of BIOC2XXX level courses and at least 12 credits of BIOC3XXX level courses, subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biochemistry
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Minor in Biochemistry offered by the Department of 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 selects courses that will compliment the individual student's Major.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to 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)

Minimum Entry Requirement:
AL Biology or AS Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biochemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6

2. Advanced level courses (24 credits)

BIOL2301 Protein structure and function 6

Plus at least 6 credits of BIOC2XXX level courses and at least 12 credits of BIOC3XXX level courses, subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biochemistry
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Minor in Biochemistry offered by the Department of 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 selects courses that will compliment the individual student's Major.

Learning Outcomes:
a. Students would be able to 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)

b. Students would be able to 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)

c. Students would be able to 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)

Minimum Entry Requirement:
AL Biology or AS Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biochemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOC1001 Basic biochemistry 6
BIOC1003 Introduction to molecular genetics 6

2. Advanced level courses (24 credits)

BIOL2301 Protein structure and function 6

Plus at least 6 credits of BIOC2XXX level courses and at least 12 credits of BIOC3XXX level courses, subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biology
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The aim of this minor is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate and apply these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based learning in the curriculum)

c. Students will be able to improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(Students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of advanced level courses (BIOL2XXX and BIOL3XXX level)

Students are recommended to take the following courses:

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2119 Genetics 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2215 Animal physiology & environmental adaptation 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title — Minor in Biology

Offered to students admitted to Year 1 in — **2011-2012**

Objectives:
The aim of this minor is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate and apply these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based learning in the curriculum)

c. Students will be able to improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(Students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of advanced level courses (BIOL2XXX and BIOL3XXX level)

Students are recommended to take the following courses:

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) 6
BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2215 Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title — Minor in Biology

Offered to students admitted to Year 1 in — **2010-2011**

Objectives:
The aim of this minor is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate and apply these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based learning in the curriculum)

c. Students will be able to improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(Students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of advanced level courses (BIOL2XXX and BIOL3XXX level)

Students are recommended to take the following courses:

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) 6
BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2215 Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2218 Human physiology 6
BIOL2611 Systematics & phylogenetics 6
BIOL3325 Molecular phylogenetics and evolution 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title | Minor in Biology

Offered to students admitted to Year 1 in | **2009-2010**

Objectives:
The aim of this minor is to provide students with a gratifying learning experience in biology. Biology is a multidisciplinary broad-based subject that forms the foundation for all life sciences in modern days. The curriculum places strong emphasis in major aspects of biology including genetics, evolution, and molecular, cellular and organismic biosystems. The program provides trainings in fundamental laboratory skills with complementary core courses. In addition, students also have the flexibility to choose from a variety of elective courses so that they may specialize in certain discipline of their own interests. Specialization is currently possible in 1) genetics and evolution, 2) molecular and cellular biology, and 3) physiology and systems biology.

Learning Outcomes:
a. Students will be able to develop scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate problems in order to develop solutions.
(by means of coursework and laboratory-based learning in the curriculum)

b. Students will be able to understand broader scientific concepts, and be able to relate and apply these to scientific issues of significance in their daily lives and also of more global significance.
(by means of coursework and laboratory-based learning in the curriculum)

c. Students will be able to improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

d. Students will be able to understand and apply key concepts in genetics, evolution, molecular biology, biochemistry, cell biology, physiology and ecosystem.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0604 Evolutionary diversity 6
BIOL1122 Functional biology 6
BIOL1133 Biological sciences laboratory course 6

(Students are strongly recommended to take "BIOL1125 Introduction to biochemistry" as an elective)

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of advanced level courses (BIOL2XXX and BIOL3XXX level)

Students are recommended to take the following courses:

BIOL2112 Plant physiology 6
BIOL2115 Cell biology & cell technology 6
BIOL2116 Genetics I (note 1) 6
BIOL2117 Genetics II (note 1) 6
BIOL2207 Endocrinology: human physiology II 6
BIOL2210 Evolution 6
BIOL2215 Animal physiology OR Animal physiology: functional interactions with environment OR Animal physiology & environmental adaptation 6
BIOL2611 Systematics & phylogenetics 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biotechnology
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Biotechnology Minor is aimed to provide students a fundamental understanding of biotechnology which is relevant to many business sections and our daily life. Students will learn the scientific principles underlying current biotechnological advances and will become literate in biotechnology business and advancements.

Learning Outcomes:
a. Develop and apply basic technical and knowledge-based skills in biotechnology.
(by means of coursework and laboratory-based learning in the curriculum)

b. Develop and apply skills of critical inquiry, teamwork, and effective communication.
(by means of group projects, tutorial classes and presentation opportunities in the curriculum)

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

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biotechnology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6
BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title | Minor in Biotechnology

Minor Title	Minor in Biotechnology
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Biotechnology Minor is aimed to provide students a fundamental understanding of biotechnology which is relevant to many business sections and our daily life. Students will learn the scientific principles underlying current biotechnological advances and will become literate in biotechnology business and advancements.

Learning Outcomes:
a. Develop and apply basic technical and knowledge-based skills in biotechnology.
(by means of coursework and laboratory-based learning in the curriculum)

b. Develop and apply skills of critical inquiry, teamwork, and effective communication.
(by means of group projects, tutorial classes and presentation opportunities in the curriculum)

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

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biotechnology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6
BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics 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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Biotechnology
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Biotechnology Minor is aimed to provide students a fundamental understanding of biotechnology which is relevant to many business sections and our daily life. Students will learn the scientific principles underlying current biotechnological advances and will become literate in biotechnology business and advancements.

Learning Outcomes:
a. Develop and apply basic technical and knowledge-based skills in biotechnology.
(by means of coursework and laboratory-based learning in the curriculum)

b. Develop and apply skills of critical inquiry, teamwork, and effective communication.
(by means of group projects, tutorial classes and presentation opportunities in the curriculum)

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

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biotechnology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6
BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics 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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title Minor in Biotechnology

Offered to students admitted to Year 1 in **2009-2010**

Objectives:
The Biotechnology Minor is aimed to provide students a fundamental understanding of biotechnology which is relevant to many business sections and our daily life. Students will learn the scientific principles underlying current biotechnological advances and will become literate in biotechnology business and advancements.

Learning Outcomes:
a. Develop and apply basic technical and knowledge-based skills in biotechnology.
(by means of coursework and laboratory-based learning in the curriculum)

b. Develop and apply skills of critical inquiry, teamwork, and effective communication.
(by means of group projects, tutorial classes and presentation opportunities in the curriculum)

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

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Biotechnology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL1122 Functional biology 6
BIOL1125 Introduction to biochemistry 6
BIOL1133 Biological sciences laboratory course 6

2. Advanced level courses (24 credits)

BIOL2303 Molecular biology 6

Plus at least 18 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2116 Genetics I (note 1) OR BIOL2119 Genetics 6
BIOL2203 Reproduction & reproductive biotechnology 6
BIOL2205 Immunology 6
BIOL2302 Fermentation technology 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL3214 General virology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3307 Biotechnology industry 6
BIOL3315 Animal biotechnology 6
BIOL3316 Plant biotechnology 6
BIOL3317 Microbial biotechnology 6

Notes:
1. Starting from the academic year 2012-2013, students should take BIOL2119 Genetics which is equivalent to BIOL2116 Genetics 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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Chemistry
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Chemistry minor is aimed to provide students who are interested in chemistry with an introduction to the fundamental concepts of chemistry. The minor curriculum is designed to provide students from different science majors with a high degree of flexibility of selecting courses to enhance their knowledge and interest in chemistry.

Learning Outcomes:
a. to understand and apply the basic concepts of chemistry;
(by means of coursework and laboratory-based learning in the curriculum)

b. to apply chemistry concepts in other subjects;
(by means of coursework and laboratory-based learning in the curriculum)

c. to transfer the basic concepts to complement their major of study.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Chemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

CHEM1002 Chemistry: principles and concepts (note 1) 6
CHEM1003 Chemistry: the molecular world 6
CHEM1009 Basic chemistry (note 1) 6
CHEM1401 Fundamentals of organic chemistry 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level), subject to prerequisite requirements.

Notes:
1 CHEM1002 and CHEM1009 are mutually exclusive

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Chemistry
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Chemistry minor is aimed to provide students who are interested in chemistry with an introduction to the fundamental concepts of chemistry. The minor curriculum is designed to provide students from different science majors with a high degree of flexibility of selecting courses to enhance their knowledge and interest in chemistry.

Learning Outcomes:
a. to understand and apply the basic concepts of chemistry;
(by means of coursework and laboratory-based learning in the curriculum)

b. to apply chemistry concepts in other subjects;
(by means of coursework and laboratory-based learning in the curriculum)

c. to transfer the basic concepts to complement their major of study.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Chemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

CHEM1002 Chemistry: principles and concepts (note 1) 6
CHEM1003 Chemistry: the molecular world 6
CHEM1009 Basic chemistry (note 1) 6
CHEM1401 Fundamentals of organic chemistry 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level), subject to prerequisite requirements.

Notes:
1 CHEM1002 and CHEM1009 are mutually exclusive

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Chemistry
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Chemistry minor is aimed to provide students who are interested in chemistry with an introduction to the fundamental concepts of chemistry. The minor curriculum is designed to provide students from different science majors with a high degree of flexibility of selecting courses to enhance their knowledge and interest in chemistry.

Learning Outcomes:
a. to understand and apply the basic concepts of chemistry;
(by means of coursework and laboratory-based learning in the curriculum)

b. to apply chemistry concepts in other subjects;
(by means of coursework and laboratory-based learning in the curriculum)

c. to transfer the basic concepts to complement their major of study.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Chemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

CHEM1002 Chemistry: principles and concepts (note 1) 6
CHEM1003 Chemistry: the molecular world 6
CHEM1009 Basic chemistry (note 1) 6
CHEM1401 Fundamentals of organic chemistry 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level), subject to prerequisite requirements.

Notes:
1 CHEM1002 and CHEM1009 are mutually exclusive

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Chemistry
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Chemistry minor is aimed to provide students who are interested in chemistry with an introduction to the fundamental concepts of chemistry. The minor curriculum is designed to provide students from different science majors with a high degree of flexibility of selecting courses to enhance their knowledge and interest in chemistry.

Learning Outcomes:
a. to understand and apply the basic concepts of chemistry;
(by means of coursework and laboratory-based learning in the curriculum)

b. to apply chemistry concepts in other subjects;
(by means of coursework and laboratory-based learning in the curriculum)

c. to transfer the basic concepts to complement their major of study.
(by means of coursework and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
AL Chemistry or a pass in CHEM0008 Fundamental chemistry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Chemistry

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

CHEM1002 Chemistry: principles and concepts (note 1) 6
CHEM1003 Chemistry: the molecular world 6
CHEM1009 Basic chemistry (note 1) 6
CHEM1401 Fundamentals of organic chemistry 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Chemistry courses (CHEM2XXX or CHEM3XXX level), subject to prerequisite requirements.

Notes:
1 CHEM1002 and CHEM1009 are mutually exclusive

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Earth Sciences
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Earth Sciences minor is aimed to provide interested students 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 interest in Earth Sciences or to complement their major of study.

Learning Outcomes:
a. to understand and describe the methods used by Earth scientists to study the Earth systems
(by means of coursework, tutorial classes and field-based learning in the curriculum)

b. to understand and describe the basic nomenclature used in Earth Sciences
(by means of coursework, tutorial classes and field-based learning in the curriculum)

c. to discuss and comment critically issues related to the Earth Sciences in media reports
(by means of coursework, group projects and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Earth Sciences

Required courses (36 credits)

1. Introductory level courses (12 credits)

Any two of the following three courses:

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Earth Sciences courses (EASC2XXX or EASC3XXX level), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Earth Sciences
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Earth Sciences minor is aimed to provide interested students 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 interest in Earth Sciences or to complement their major of study.

Learning Outcomes:
a. to understand and describe the methods used by Earth scientists to study the Earth systems
(by means of coursework, tutorial classes and field-based learning in the curriculum)

b. to understand and describe the basic nomenclature used in Earth Sciences
(by means of coursework, tutorial classes and field-based learning in the curriculum)

c. to discuss and comment critically issues related to the Earth Sciences in media reports
(by means of coursework, group projects and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Earth Sciences

Required courses (36 credits)

1. Introductory level courses (12 credits)

Any two of the following three courses:

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Earth Sciences courses (EASC2XXX or EASC3XXX level), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Earth Sciences
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Earth Sciences minor is aimed to provide interested students 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 interest in Earth Sciences or to complement their major of study.

Learning Outcomes:
a. to understand and describe the methods used by Earth scientists to study the Earth systems
(by means of coursework, tutorial classes and field-based learning in the curriculum)

b. to understand and describe the basic nomenclature used in Earth Sciences
(by means of coursework, tutorial classes and field-based learning in the curriculum)

c. to discuss and comment critically issues related to the Earth Sciences in media reports
(by means of coursework, group projects and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Earth Sciences

Required courses (36 credits)

1. Introductory level courses (12 credits)

Any two of the following three courses:

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Earth Sciences courses (EASC2XXX or EASC3XXX level), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Earth Sciences
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Earth Sciences minor is aimed to provide interested students 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 interest in Earth Sciences or to complement their major of study.

Learning Outcomes:
a. to understand and describe the methods used by Earth scientists to study the Earth systems
(by means of coursework, tutorial classes and field-based learning in the curriculum)

b. to understand and describe the basic nomenclature used in Earth Sciences
(by means of coursework, tutorial classes and field-based learning in the curriculum)

c. to discuss and comment critically issues related to the Earth Sciences in media reports
(by means of coursework, group projects and presentation opportunities in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Earth Sciences

Required courses (36 credits)

1. Introductory level courses (12 credits)

Any two of the following three courses:

EASC0105 Earth through time 6
EASC0116 Introduction to physical geology 6
EASC0118 Blue planet 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Earth Sciences courses (EASC2XXX or EASC3XXX level), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
This minor 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 of this minor will then be able to build upon this basic knowledge 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:
a. 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)

b. 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)

c. 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Ecology & Biodiversity

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6
BIOL1608 Biostatistics 6

2. Advanced level courses (24 credits)

Plus at least 24 credits of the following courses:

BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2610 Marine biology 6
BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL2625 Animal behaviour 6
BIOL3622 Ecological impact assessment 6
BIOL3626 Conservation in practice 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
This minor 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 of this minor will then be able to build upon this basic knowledge 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:
a. 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)

b. 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)

c. 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Ecology & Biodiversity

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6

2. Advanced level courses (24 credits)

Plus at least 24 credits of the following courses:

BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2608 Biometrics (note 1) 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL3622 Ecological impact assessment 6

Notes:
1. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
This minor 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 of this minor will then be able to build upon this basic knowledge 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:
a. 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)

b. 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)

c. 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Ecology & Biodiversity

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0625 Ecology and evolution 6

2. Advanced level courses (24 credits)

Plus at least 24 credits of the following courses:

BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2608 Biometrics (note 1) 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation ecology 6
BIOL2615 Freshwater ecology 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6
BIOL2621 Plant structure and evolution 6
BIOL2622 The biology of marine mammals 6
BIOL3622 Ecological impact assessment 6

Notes:
1. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
This minor 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 of this minor will then be able to build upon this basic knowledge 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:
a. 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)

b. 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)

c. 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Ecology & Biodiversity

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of the following courses:

BIOL0601 Ecology of Hong Kong (note 1) (3) OR BIOL0600 Ecology of Hong Kong 6
BIOL0604 Evolutionary diversity 6
BIOL0605 Ecology field course (note 1) 3
BIOL0625 Ecology and evolution 6

2. Advanced level courses (24 credits)

Plus at least 24 credits of the following courses:

BIOL2606 Environmental microbiology 6
BIOL2607 Fish biology 6
BIOL2608 Biometrics (note 2) 6
BIOL2610 Biological oceanography OR Marine biology 6
BIOL2611 Systematics & phylogenetics 6
BIOL2612 Conservation biology OR Conservation ecology 6
BIOL2615 Freshwater ecology 6
BIOL2616 Plant structure and evolution (note 1) (3) OR BIOL2621 Plant structure and evolution 6
BIOL2617 Coastal ecology OR Experimental intertidal ecology 6
BIOL2619 Terrestrial ecology 6

Notes:
1. Not available in 2010-2011 or thereafter.
2. Not available in 2012-2013 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title Minor in Food & Nutritional Science

Offered to students admitted to Year 1 in **2012-2013**

Objectives:
The Food and Nutritional Science minor 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:
a. Demonstrate broad knowledge in the field of food and nutritional science.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

b. 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)

c. 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)

d. 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)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Food & Nutritional Science

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2538 Nutraceuticals and functional foods
BIOL2540 Food and nutritional toxicology 6
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behavious 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Food and Nutritional Science minor 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:
a. Demonstrate broad knowledge in the field of food and nutritional science.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

b. 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)

c. 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)

d. 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)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Food & Nutritional Science

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2538 Nutraceuticals and functional foods
BIOL2540 Basics of toxicology OR Food and nutritional toxicology 6
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behavious 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Food and Nutritional Science minor 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:
a. Demonstrate broad knowledge in the field of food and nutritional science.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

b. 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)

c. 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)

d. 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)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Food & Nutritional Science

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2529 Food and nutritional toxicology OR BIOL2540 Basics of Toxicology OR Food and nutritional toxicology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2538 Nutraceuticals and functional foods
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behavious 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Food and Nutritional Science minor 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:
a. Demonstrate broad knowledge in the field of food and nutritional science.
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

b. 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)

c. 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)

d. 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)

Minimum Entry Requirement:
AL Biology or equivalent or a pass in BIOL0126 Fundamentals of biology and AL / AS Chemistry or equivalent or a pass in CHEM0008 Fundamental chemistry

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Food & Nutritional Science

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOL1514 Nutrition and metabolism 6
BIOL1528 Food chemistry 6

The following course is strongly recommended as an elective:
BIOL0002 Introduction to food and nutritional science (note 1) 3

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

BIOL2218 Human physiology 6
BIOL2302 Fermentation technology 6
BIOL2503 Grain production & utilization 6
BIOL2507 Meat and dairy science 6
BIOL2515 Food microbiology 6
BIOL2529 Food and nutritional toxicology OR BIOL2540 Basics of Toxicology OR Food and nutritional toxicology 6
BIOL2530 Molecular biology and nutrigenomics 6
BIOL2531 Principles of Chinese medicinal diet 6
BIOL2532 Diet and disease 6
BIOL2533 Nutrition and life cycle 6
BIOL2534 Nutrition and public health 6
BIOL2535 Food processing and engineering laboratory course 6
BIOL2536 Food and nutrients analysis laboratory course 6
BIOL2538 Nutraceuticals and functional foods
BIOL3527 Food safety and quality management 6
BIOL3538 Food product development 6
BIOL3540 Diet, brain function and behavious 6

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in General Science
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
Science is an indispensable component of this modern world, with a significant impact to our daily lives. Be it the interaction between animals and their natural environment, the food in our daily diet, the synthesis of new materials (nanomaterials, polymeric and semiconducting materials), the mystery of the human gene, or the application of mathematics to solve problems. This Minor is suitable for non-Science students who are interested in exploring science and learning how scientists study the real world. The scientific knowledge, quantitative reasoning, logical and analytical thinking and sense of numeracy will be useful in various fields of finance, business, social sciences, arts and education. Students have the flexibility to gather courses in any area of interest.

Learning Outcomes:
NIL

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil (This Minor is only offered to non-Faculty of Science students.)

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of any introductory level Science courses (level 0 & 1), subject to prerequisite requirements.

2. Advanced level courses (24 credits)

At least 24 credits of any advanced level Science courses (level 2 & 3), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in General Science
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
Science is an indispensable component of this modern world, with a significant impact to our daily lives. Be it the interaction between animals and their natural environment, the food in our daily diet, the synthesis of new materials (nanomaterials, polymeric and semiconducting materials), the mystery of the human gene, or the application of mathematics to solve problems. This Minor is suitable for non-Science students who are interested in exploring science and learning how scientists study the real world. The scientific knowledge, quantitative reasoning, logical and analytical thinking and sense of numeracy will be useful in various fields of finance, business, social sciences, arts and education. Students have the flexibility to gather courses in any area of interest.

Learning Outcomes:
NIL

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil (This Minor is only offered to non-Faculty of Science students.)

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of any introductory level Science courses (level 0 & 1), subject to prerequisite requirements.

2. Advanced level courses (24 credits)

At least 24 credits of any advanced level Science courses (level 2 & 3), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in General Science
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
Science is an indispensable component of this modern world, with a significant impact to our daily lives. Be it the interaction between animals and their natural environment, the food in our daily diet, the synthesis of new materials (nanomaterials, polymeric and semiconducting materials), the mystery of the human gene, or the application of mathematics to solve problems. This Minor is suitable for non-Science students who are interested in exploring science and learning how scientists study the real world. The scientific knowledge, quantitative reasoning, logical and analytical thinking and sense of numeracy will be useful in various fields of finance, business, social sciences, arts and education. Students have the flexibility to gather courses in any area of interest.

Learning Outcomes:
NIL

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil (This Minor is only offered to non-Faculty of Science students.)

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of any introductory level Science courses (level 0 & 1), subject to prerequisite requirements.

2. Advanced level courses (24 credits)

At least 24 credits of any advanced level Science courses (level 2 & 3), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in General Science
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
Science is an indispensable component of this modern world, with a significant impact to our daily lives. Be it the interaction between animals and their natural environment, the food in our daily diet, the synthesis of new materials (nanomaterials, polymeric and semiconducting materials), the mystery of the human gene, or the application of mathematics to solve problems. This Minor is suitable for non-Science students who are interested in exploring science and learning how scientists study the real world. The scientific knowledge, quantitative reasoning, logical and analytical thinking and sense of numeracy will be useful in various fields of finance, business, social sciences, arts and education. Students have the flexibility to gather courses in any area of interest.

Learning Outcomes:
NIL

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Nil (This Minor is only offered to non-Faculty of Science students.)

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits of any introductory level Science courses (level 0 & 1), subject to prerequisite requirements.

2. Advanced level courses (24 credits)

At least 24 credits of any advanced level Science courses (level 2 & 3), subject to prerequisite requirements.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Global Climate Change
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
Global Climate Change is one of the most pressing issues affecting all mankind in today's world. The Global Climate Change minor is aimed to provide interested students an introduction to the phenomenon of global climate change, it's impact on Earth's inhabitants, and various anthropogenic and natural factors, which cause the change. The curriculum of this minor is designed particularly to provide students from different majors the flexibility to select courses to enhance their interest in Global Climate Change or to complement their major of study.

Learning Outcomes:
a. to recognize, explain and connect the basic principles, concepts, theories, pertaining to the global climate change debate using appropriate scientific language
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

b. to describe and interpret the evolution of Earth's climate system
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

c. to communicate, analyse and explain the past and possible future effects of global climate change on Earth's inhabitants
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

d. to describe and compare anthropogenic and natural factors responsible for climate change at different timeframes.
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
NIL (note 1)

Required courses (36 credits)

1. Introductory level courses (12 credits)

EASC0122 Introduction to climate science 6

Plus at least 6 credits from the following courses:

BIOL0625 Ecology and evolution 6
EASC0105 Earth through time 6
EASC0118 Blue planet 6
PHYS0629 Weather and climate 6

2. Advanced level courses (24 credits)

EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6

Plus at least 12 credits from the following courses:

BIOL2610 Biological oceanography 6
BIOL2612 Conservation ecology 6
CHEM2102 Environmental chemistry 6
EASC2005 Meteorology 6
EASC2112 Earth systems 6
ENVS2013 Environmental oceanography 6

Notes:
1 For students having major / minor combination of Earth Sciences / Global Climate Change, any single introductory or advanced level Earth Sciences course can be used to satisfy a major or minor requirement only once.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Global Climate Change
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
Global Climate Change is one of the most pressing issues affecting all mankind in today's world. The Global Climate Change minor is aimed to provide interested students an introduction to the phenomenon of global climate change, it's impact on Earth's inhabitants, and various anthropogenic and natural factors, which cause the change. The curriculum of this minor is designed particularly to provide students from different majors the flexibility to select courses to enhance their interest in Global Climate Change or to complement their major of study.

Learning Outcomes:
a. to recognize, explain and connect the basic principles, concepts, theories, pertaining to the global climate change debate using appropriate scientific language
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

b. to describe and interpret the evolution of Earth's climate system
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

c. to communicate, analyse and explain the past and possible future effects of global climate change on Earth's inhabitants
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

d. to describe and compare anthropogenic and natural factors responsible for climate change at different timeframes.
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
NIL (note 1)

Required courses (36 credits)

1. Introductory level courses (12 credits)

EASC0122 Introduction to climate science 6

Plus at least 6 credits from the following courses:

BIOL0625 Ecology and evolution 6
EASC0105 Earth through time 6
EASC0118 Blue planet 6
PHYS0629 Weather and climate 6

2. Advanced level courses (24 credits)

EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6

Plus at least 12 credits from the following courses:

BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
CHEM2102 Environmental chemistry 6
EASC2005 Meteorology 6
EASC2112 Earth systems 6
ENVS2013 Environmental oceanography 6

Notes:
1 For students having major / minor combination of Earth Sciences / Global Climate Change, any single introductory or advanced level Earth Sciences course can be used to satisfy a major or minor requirement only once.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Global Climate Change
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
Global Climate Change is one of the most pressing issues affecting all mankind in today's world. The Global Climate Change minor is aimed to provide interested students an introduction to the phenomenon of global climate change, it's impact on Earth's inhabitants, and various anthropogenic and natural factors, which cause the change. The curriculum of this minor is designed particularly to provide students from different majors the flexibility to select courses to enhance their interest in Global Climate Change or to complement their major of study.

Learning Outcomes:
a. to recognize, explain and connect the basic principles, concepts, theories, pertaining to the global climate change debate using appropriate scientific language
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

b. to describe and interpret the evolution of Earth's climate system
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

c. to communicate, analyse and explain the past and possible future effects of global climate change on Earth's inhabitants
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

d. to describe and compare anthropogenic and natural factors responsible for climate change at different timeframes.
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
NIL (note 1)

Required courses (36 credits)

1. Introductory level courses (12 credits)

EASC0122 Introduction to climate science 6

Plus at least 6 credits from the following courses:

BIOL0625 Ecology and evolution 6
EASC0105 Earth through time 6
EASC0118 Blue planet 6
PHYS0629 Weather and climate 6

2. Advanced level courses (24 credits)

EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6

Plus at least 12 credits from the following courses:

BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
CHEM2102 Environmental chemistry 6
EASC2005 Meteorology 6
EASC2112 Earth systems 6
EASC2128 Earth-ocean-atmosphere interactions 6
EASC2129 Physical oceanography 6
EASC2130 Earth observation and remote sensing 6

Notes:
1 For students having major / minor combination of Earth Sciences / Global Climate Change, any single introductory or advanced level Earth Sciences course can be used to satisfy a major or minor requirement only once.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title: Minor in Global Climate Change

Offered to students admitted to Year 1 in: **2009-2010**

Objectives:
Global Climate Change is one of the most pressing issues affecting all mankind in today's world. The Global Climate Change minor is aimed to provide interested students an introduction to the phenomenon of global climate change, it's impact on Earth's inhabitants, and various anthropogenic and natural factors, which cause the change. The curriculum of this minor is designed particularly to provide students from different majors the flexibility to select courses to enhance their interest in Global Climate Change or to complement their major of study.

Learning Outcomes:
a. to recognize, explain and connect the basic principles, concepts, theories, pertaining to the global climate change debate using appropriate scientific language
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

b. to describe and interpret the evolution of Earth's climate system
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

c. to communicate, analyse and explain the past and possible future effects of global climate change on Earth's inhabitants
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

d. to describe and compare anthropogenic and natural factors responsible for climate change at different timeframes.
(by means of coursework, tutorial and laboratory-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
NIL (note 1)

Required courses (36 credits)

1. Introductory level courses (12 credits)

EASC0121 Earth's climate past and future 3
EASC0136 Introduction to climatology 3

Plus at least 6 credits from the following courses:

BIOL0605 Ecology field course 3
BIOL0625 Ecology and evolution 6
EASC0105 Earth through time 6
EASC0118 Blue planet 6
EASC0120 Earth, environment and society 6
PHYS0610 Weather today 3

2. Advanced level courses (24 credits)

EASC2127 Global change: anthropogenic impact 6
EASC2131 A cool world: ice ages and climate change 6

Plus at least 12 credits from the following courses:

BIOL2610 Biological oceanography OR Marine biology 6
BIOL2612 Conservation ecology 6
CHEM2102 Environmental chemistry 6
EASC2005 Meteorology 6
EASC2112 Earth systems 6
EASC2128 Earth-ocean-atmosphere interactions 6
EASC2129 Physical oceanography 6
EASC2130 Earth observation and remote sensing 6

Notes:
1 For students having major / minor combination of Earth Sciences / Global Climate Change, any single introductory or advanced level Earth Sciences course can be used to satisfy a major or minor requirement only once.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Mathematics
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Mathematics Minor provides the students with fundamental undergraduate education 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:
a. to be able to understand and describe fundamental concepts of mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)

b. to be able to apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. to be able to communicate and discuss scientific issues related to mathematics
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics; Mathematics/Physics

Required courses (36 credits)

1. Introductory level courses (12 credits) (note 2)

MATH1111 Linear algebra 6

Plus one of the following courses:

MATH1211 Multivariable calculus 6
MATH1805 University mathematics B 6
MATH1813 Mathematical methods for actuarial science 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students are strongly advised to take also MATH1001.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Mathematics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Mathematics Minor provides the students with fundamental undergraduate education 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:
a. to be able to understand and describe fundamental concepts of mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)

b. to be able to apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. to be able to communicate and discuss scientific issues related to mathematics
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics; Mathematics/Physics

Required courses (36 credits)

1. Introductory level courses (12 credits) (note 2)

MATH1111 Linear algebra 6

Plus one of the following courses:

MATH1211 Multivariable calculus 6
MATH1805 University mathematics B 6
MATH1813 Mathematical methods for actuarial science 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students are strongly advised to take also MATH1001.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Mathematics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Mathematics Minor provides the students with fundamental undergraduate education 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:
a. to be able to understand and describe fundamental concepts of mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)

b. to be able to apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. to be able to communicate and discuss scientific issues related to mathematics
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics; Mathematics/Physics

Required courses (36 credits)

1. Introductory level courses (12 credits) (note 2)

MATH1111 Linear algebra 6

Plus one of the following courses:

MATH1211 Multivariable calculus 6
MATH1805 University mathematics B 6
MATH1813 Mathematical methods for actuarial science 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students are strongly advised to take also MATH1001.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Mathematics
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Mathematics Minor provides the students with fundamental undergraduate education 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:
a. to be able to understand and describe fundamental concepts of mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)

b. to be able to apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. to be able to communicate and discuss scientific issues related to mathematics
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Minimum Entry Requirement:
(note 1)
1. HKCEE Additional Mathematics and AS Mathematics and Statistics; or
2. AL Pure Mathematics; or
3. a pass in MATH0201 Basic calculus (for those with HKCEE Math only) or a pass in MATH1804 University mathematics A (for those with AS Math & Stat only)

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics; Mathematics/Physics

Required courses (36 credits)

1. Introductory level courses (12 credits) (note 2)

MATH1111 Linear algebra 6

Plus one of the following courses:

MATH1211 Multivariable calculus 6
MATH1805 University mathematics B 6
MATH1813 Mathematical methods for actuarial science 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Mathematics courses (MATH2XXX or MATH3XXX or MATH6XXX level), subject to prerequisite requirements.

Notes:
1 Students with different mathematics background must consult the Department of Mathematics for advice on the bridging courses.
2 Students are strongly advised to take also MATH1001.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Microbiology
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The aim of this minor is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe selected concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Microbiology

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (24 credits)

At least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 12 credits of the following:

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Microbiology
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The aim of this minor is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe selected concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Microbiology

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (24 credits)

At least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 12 credits of the following:

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Microbiology
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The aim of this minor is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe selected concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Microbiology

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

BIOL0135 Introductory microbiology 6
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (24 credits)

At least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 12 credits of the following:

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Microbiology
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The aim of this minor is to provide students with a stimulating, valuable and enjoyable learning experience in microbiology, a key life science discipline for the 21st century. Microbiology lies at the heart of understanding human health and disease, environmental processes and protection and advances in biotechnology and industrial microbiology. The curriculum places a strong emphasis on modern molecular approaches and analytical techniques. Core courses provide training in fundamental scientific skills and students also have the flexibility to choose form a variety of elective courses so that they may pursue their own interests in microbiology. Specialization is currently possible in medical microbiology, food microbiology, environmental microbiology and microbial biotechnology. Students interact closely with professors in a variety of interactive learning opportunities including laboratory classes and fieldtrips, seminars, tutorials and group activities. The critical thinking and communication skills emphasized during learning in this major are highly sought-after by employers.

Learning Outcomes:
a. Students will acquire the ability to clearly describe selected concepts and advances in microbiology including: the evolution and diversity of microbial life, microbial physiology, the occurrence and role of microorganisms in natural environments, the role of microorganisms in disease and medicine, food production and spoilage, plus their applications in biotechnology.
(achieved through lectures and interactive learning experiences)

b. Students will develop an understanding of broader scientific concepts, and be able to relate these to scientific issues of significance in their daily lives and also of more global significance.
(achieved through lectures and interactive learning experiences)

c. Students will develop their skills in critical thinking and the ability to recognize real-world situations where they may apply these skills.
(achieved through problem-based learning experiences)

d. Students will improve their oral and written communication skills, and gain confidence in interacting with their peers and professors individually and as part of a team.
(achieved through interactive learning experiences)

Minimum Entry Requirement:
AL Biology or equivalent, or a pass in BIOL0126 Fundamentals of biology

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Microbiology

Required courses (36 credits)

1. Introductory level courses (12 credits)

12 credits of the following courses:

BIOL0129 Introductory microbiology (note 1) (3) OR BIOL0135 Introductory microbiology 6
BIOL0131 Basic medical microbiology (note 1) 3
BIOL1125 Introduction to biochemistry OR BIOC1001 Basic biochemistry 6
BIOL1133 Biological science laboratory course 6

2. Advanced level courses (24 credits)

At least 12 credits of the following courses:

BIOL2111 Molecular microbiology 6
BIOL2205 Immunology 6
BIOL2303 Molecular biology 6
BIOL2324 Microbial physiology and biochemistry 6

Plus at least 12 credits of the following:

BIOL2515 Food microbiology 6
BIOL2606 Environmental microbiology 6
BIOL3219 Clinical microbiology and applied immunology 6
BIOL3317 Microbial biotechnology 6

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Physics
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Minor in Physics is intended to provide interested students 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:
a. Students should be able to identify and describe physical systems with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should be able to analyze some physics problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and laboratory works in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics/Physics; Physics

Required courses (36 credits)

1. Introductory level courses (12 credits)

PHYS1417 Basic physics 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 1)

Or
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 Students are strongly advised to take at least one of the following courses: PHYS1414 or PHYS1415 to allow for maximum flexibility in course selection for advanced level Physics courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Physics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Minor in Physics is intended to provide interested students 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:
a. Students should be able to identify and describe physical systems with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should be able to analyze some physics problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and laboratory works in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics/Physics; Physics

Required courses (36 credits)

1. Introductory level courses (12 credits)

PHYS1417 Basic physics 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 1)

Or
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 Students are strongly advised to take at least one of the following courses: PHYS1414 or PHYS1415 to allow for maximum flexibility in course selection for advanced level Physics courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Physics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Minor in Physics is intended to provide interested students 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:
a. Students should be able to identify and describe physical systems with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should be able to analyze some physics problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and laboratory works in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics/Physics; Physics

Required courses (36 credits)

1. Introductory level courses (12 credits)

PHYS1417 Basic physics 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 1)

Or
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 Students are strongly advised to take at least one of the following courses: PHYS1414 or PHYS1415 to allow for maximum flexibility in course selection for advanced level Physics courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Physics
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The Minor in Physics is intended to provide interested students 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:
a. Students should be able to identify and describe physical systems with fundamental knowledge in physics.
(By means of coursework and tutorial classes in the curriculum)

b. Students should be able to analyze some physics problems qualitatively and quantitatively.
(By means of coursework, tutorial classes and laboratory works in the curriculum)

c. Students should be able to communicate and collaborate with people effectively in scientific issues.
(By means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Minimum Entry Requirement:
AL / AS Physics or AL Engineering Science; or a pass in PHYS0114 Fundamental physics I and PHYS0115 Fundamental physics II or a pass in PHYS0625 Physics by inquiry or equivalent

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Mathematics/Physics; Physics

Required courses (36 credits)

1. Introductory level courses (12 credits)

PHYS1417 Basic physics 6

Plus at least 6 credits of introductory level Physics course (PHYS0XXX or PHYS1XXX level) (note 1)

Or
PHYS1414 General physics I 6
PHYS1415 General physics II 6

2. Advanced level courses (24 credits)

Any 24 credits of advanced level Physics courses (PHYS2XXX or PHYS3XXX or PHYS6XXX level), subject to prerequisite requirements.

Notes:
Refer to the Physics Department website http://www.physics.hku.hk for suggested curriculum.
1 Students are strongly advised to take at least one of the following courses: PHYS1414 or PHYS1415 to allow for maximum flexibility in course selection for advanced level Physics courses.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Risk Management
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The Risk Management minor 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 interest in Risk Management or to complement their major of study.

Learning Outcomes:
a. Students would 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)

b. Students would be able to apply elementary methods and models for risk assessment and management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. Students would be able to acquire and interpret relevant data and information for risk management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Risk Management

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT0302 Business statistics 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
One of the advanced level courses listed below 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2314 Business forecasting 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3323 Current topics in risk management 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Risk Management
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The Risk Management minor 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 interest in Risk Management or to complement their major of study.

Learning Outcomes:
a. Students would 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)

b. Students would be able to apply elementary methods and models for risk assessment and management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. Students would be able to acquire and interpret relevant data and information for risk management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Risk Management

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6
STAT0302 Business statistics 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
One of the advanced level courses listed below 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2314 Business forecasting 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3323 Current topics in risk management 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Risk Management
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The Risk Management minor 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 interest in Risk Management or to complement their major of study.

Learning Outcomes:
a. Students would 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)

b. Students would be able to apply elementary methods and models for risk assessment and management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. Students would be able to acquire and interpret relevant data and information for risk management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Risk Management

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6
STAT0302 Business statistics 6

Alternative courses possible in the case of students taking Major/Minor in Statistics with an overlap of core courses:
Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
One of the advanced level courses listed below 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2314 Business forecasting 6
STAT2315 Practical mathematics for investment 6
STAT3301 Time-series analysis 6
STAT3303 Derivatives and risk management 6
STAT3320 Risk management and Basel Accords in banking and finance/Risk management and Basel II in banking and finance 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title — Minor in Risk Management

Offered to students admitted to Year 1 in — **2009-2010**

Objectives:
The Risk Management minor 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 interest in Risk Management or to complement their major of study.

Learning Outcomes:
a. Students would 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)

b. Students would be able to apply elementary methods and models for risk assessment and management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

c. Students would be able to acquire and interpret relevant data and information for risk management.
(by means of coursework, tutorial classes and project-based learning in the curriculum)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Risk Management; Statistics
Minor in Statistics

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6
STAT0302 Business statistics 6

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
One of the advanced level courses listed below 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2314 Business forecasting 6
STAT2315 Practical mathematics for investment 6
STAT2320 (note 1) / STAT3320 Risk management and Basel Accords in banking and finance/Risk management and Basel II in banking and finance 6
STAT2812 Financial economics I 6
STAT3301 Time-series analysis 6
STAT3308 Financial engineering (note 1) OR STAT3303 Derivatives and risk management 6
STAT3321 Credit risk analysis 6
STAT3322 Market risk analysis 6
STAT3821 Financial economics II 6

Notes:
1 Not available in 2010-2011 or thereafter.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Statistics
Offered to students admitted to Year 1 in	**2012-2013**

Objectives:
The curriculum of the Statistics minor 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:
a. Students would 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)

b. Students would be equipped with computational skills essential to conducting complete data analyses.
(by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)

c. Students would be able to 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Statistics

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT0302 Business statistics 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
STAT1323 Introduction to demographic and socio-economic statistics 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses:
Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2301 Linear statistical analysis 6
STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT2305 Quality control and management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT2314 Business forecasting 6
STAT2317 Sample survey methods 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT2316 Advanced SAS programming 6
STAT3306 Selected topics in statistics 6
STAT3811 Survival analysis 6
Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Statistics
Offered to students admitted to Year 1 in	**2011-2012**

Objectives:
The curriculum of the Statistics minor 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:
a. Students would 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)

b. Students would be equipped with computational skills essential to conducting complete data analyses.
(by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)

c. Students would be able to 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Statistics

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT0302 Business statistics 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses: Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2301 Linear statistical analysis 6
STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT2305 Quality control and management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT2314 Business forecasting 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6
STAT3306 Selected topics in statistics 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6
STAT3811 Survival analysis 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Statistics
Offered to students admitted to Year 1 in	**2010-2011**

Objectives:
The curriculum of the Statistics minor 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:
a. Students would 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)

b. Students would be equipped with computational skills essential to conducting complete data analyses.
(by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)

c. Students would be able to 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Statistics

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT0302 Business statistics 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6

Alternative courses possible in the case of students taking Major/Minor in Risk Management with an overlap of core courses: Any 6-credit advanced level statistics courses (STAT2XXX, STAT3XXX or STAT6XXX level), subject to the Department's approval.

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2301 Linear statistical analysis 6
STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT2305 Quality control and management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT2314 Business forecasting 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6
STAT3306 Selected topics in statistics 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6
STAT3811 Survival analysis 6

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

Minor Title	Minor in Statistics
Offered to students admitted to Year 1 in	**2009-2010**

Objectives:
The curriculum of the Statistics minor 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:
a. Students would 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)

b. Students would be equipped with computational skills essential to conducting complete data analyses.
(by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)

c. Students would be able to 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)

Minimum Entry Requirement:
NIL

Minimum Credit Requirement:
36 credits (12 credits introductory level & 24 credits advanced level courses)

Impermissible Combination:
Major in Risk Management; Statistics
Minor in Risk Management

Required courses (36 credits)

1. Introductory level courses (12 credits)

One of the following courses:

STAT0301 Elementary statistical methods 6
STAT0302 Business statistics 6
STAT1301 Probability and statistics I 6
STAT1306 Introductory statistics 6

Plus at least 6 credits of the following courses:

STAT1302 Probability and statistics II 6
STAT1303 Data management 6
STAT1304 Design and analysis of sample surveys 6

2. Advanced level courses (24 credits)

At least 24 credits of the following courses:

STAT2301 Linear statistical analysis 6
STAT2302 Statistical inference 6
STAT2303 Probability modelling 6
STAT2304 Design and analysis of experiments 6
STAT2305 Quality control and management 6
STAT2306 Business logistics 6
STAT2307 Statistics in clinical medicine & bio-medical research 6
STAT2308 Statistical genetics 6
STAT2309 The statistics of investment risk 6
STAT2310 Risk management and insurance 6
STAT2311 Computer-aided data analysis 6
STAT2312 Data mining 6
STAT2313 Marketing engineering 6
STAT2314 Business forecasting 6
STAT2315 Practical mathematics for investment 6
STAT2320 (note 1) / STAT3320 Risk management and Basel II in banking and finance 6
STAT2812 Financial economics I 6
STAT3301 Time-series analysis 6
STAT3302 Multivariate data analysis 6
STAT3304 Computer-aided statistical modelling 6
STAT3306 Selected topics in statistics 6
STAT3308 Financial engineering (note 1) OR STAT3303 Derivatives and risk management 6
STAT3316 Advanced probability 6
STAT3317 Computational statistics 6

STAT3322 Market risk analysis 6
STAT3811 Survival analysis 6
STAT3821 Financial economics II 6

Notes:
1 Not available in 2010-2011 or thereafter.
The following combinations of courses are recommended for students interested in more focused areas:
(a) Statistical theory and research methodology: STAT1301, STAT1302, STAT2301, STAT2302, STAT2303, STAT3301, STAT3302, STAT3316.
(b) Finance and investment: STAT1303, STAT2301, STAT2309, STAT2310, STAT2311, STAT2314, STAT2315, STAT2320, STAT2812, STAT3301, STAT3308, STAT3322, STAT3821.
(c) Business and management: STAT1303, STAT1304, STAT2301, STAT2305, STAT2306, STAT2311, STAT2312, STAT2313, STAT2314, STAT3302.
(d) Biological sciences: STAT1303, STAT2301, STAT2303, STAT2304, STAT2307, STAT2308, STAT2311, STAT3811.
(e) Information technology: STAT1303, STAT2311, STAT2312, STAT3304, STAT3317, STAT3322.

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 major or/and minor in order to satisfy the degree graduation requirements. Courses which appear in 2 or more majors or minors will only be counted once.

SECTION VII

Replacement Courses for the same disciplinary courses appear in two or more Science Majors or Minors

SCIENCE

SECTION VII Replacement Courses for the same disciplinary courses appear in two or more Science Majors and Minors

The same disciplinary course may appear as required course in two or more Science majors or minors. Each course can only be used to satisfy the curriculum requirement of one major or one minor, even if that course appears in the curriculum of two majors or minors.

Students have to select another course to replace the course in the second major/minor and seek the written approval from the departmental course selection adviser offering the second major/minor by completing 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

SCIENCE

BIOC1001 Basic biochemistry (6 credits)		Academic Year	2012
Offering Department	Biochemistry	Quota	300
Course Co-ordinator	Prof D K Y Shum, Biochemistry		
Course Aim	This course is designed to present an overview of biochemistry of fundamental importance to the life process. We aim to develop appreciation of the basics in biochemistry as a common ground for science and non-science students to progress into their areas of specialization. Students intending to pursue further studies in Biochemistry and Molecular Biology will find this course particularly helpful.		
Course Contents	Structure and functions of carbohydrates, lipids, nucleic acids, amino acids and proteins; enzymes and co-enzymes; basic bioenergetics; pH and ionic buffers in cellular environments; key metabolic processes in a living cell; separation and purification techniques in biochemistry; bioregulaotry mechanisms		
Learning Outcomes	On successful completion of this course, students should be able to: - recognize the importance of pH and ionic buffers in cellular environments; - relate structures to functions of biomolecules; - explain the functions of key metabolic processes; - explain the significance of biological regulation; - describe the basic principles of separation and purification of biological molecules.		
Pre-requisites	(E or above in AL Biol or AL/AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have passed in BIOL1125, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	Examination	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; tutorial may be scheduled		
Assessment Method	One 2-hour written final examination (70% weighting) and mid-term assessment (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates thorough and complete mastery of the entire range of knowledge and analytical skills as required for maximal attainment in all the course learning outcomes; excellence in critical thinking towards application of the knowledge in a range of contexts. B: Demonstrates substantial command of a broad range of knowledge and analytical skills as required for attainment of the majority of course learning outcomes; good evidence of critical thinking towards application of the knowledge in a range of contexts. C: Demonstrates general but incomplete command of knowledge and analytical skills as required for attainment of adequate course learning outcomes; some evidence critical thinking towards application of the knowledge in a range of contexts. D: Demonstrates partial but limited command of knowledge and analytical skills as required for attainment of some of the course learning outcomes; limited evidence of critical thinking towards application of the knowledge in a range of contexts. Fail: Demonstrates little or no evidence of command of knowledge and analytical skills as required for attainment of the course learning outcomes; lacking in critical thinking towards application of the knowledge in a range of contexts.		
Textbooks	Nelson DL, Cox MM (2008) Lehninger Principles of Biochemistry, 5th ed. W.H. Freeman, New York.		
References	Any other Biochemistry textbooks, e.g. Berg JM, Tymoczko JL, Stryer L (2007) Biochemistry, 6th ed. W.H. Freeman, New York.		

BIOC1003 Introduction to molecular genetics (6 credits)		Academic Year	2012
Offering Department	Biochemistry	Quota	150
Course Co-ordinator	Dr J D Huang, Biochemistry		
Course Aim	The objectives of this course are to provide students with basic and up-to-date knowledge on the structures and functions of nucleic acids, to give students a general picture of the molecular process of gene expressions, and to introduce students to recombinant DNA technology.		
Course Contents	chromosome structure and DNA replication transcription translation regulation of gene expression mutagenesis and DNA repair basic principles of recombinant DNA techniques and their application for the isolation and characterization of genes.		
Learning Outcomes	On successful completion of this course, students should be able to: - discuss the role of DNA in genetics; - describe the structure of DNA and chromosomes; - describe the processes involved in the information flow from DNA to proteins; - describe how DNA damages are repaired; - design simple strategies for the generation of recombinant DNA.		
Pre-requisites	E or above in AL Biol/AL Chem or AS Chem; or Pass in CHEM0004 or CHEM0008		
Offer in 2012 - 2013	2nd sem	Examination	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 6 tutorials		
Assessment Method	One 2-hour written examination (80% weighting) and in class quiz (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Displays a thorough and complete grasp of the subject and is able to apply the knowledge in a wide range of complex, familiar and unfamiliar experimental contexts. Evidence of strong analytical and critical thinking when dealing with scientific data.		

	B	Displays a substantial and near-complete grasp of the subject and is able to apply the knowledge in a range of familiar and unfamiliar experimental contexts. Evidence of analytical and critical thinking when dealing with scientific data.
	C	Displays a general grasp of the subject and is sometimes able to apply the knowledge in a range of familiar and unfamiliar experimental contexts. Limited evidence of analytical and critical thinking when dealing with scientific data.
	D	Displays a limited grasp of the subject and is sometimes able to apply the knowledge in an experimental context. Poor analytical and critical thinking when dealing with scientific data.
	Fail	Displays an incorrect or incomplete grasp of the subject and is unable to apply the knowledge in an experimental context. Unable to analyse scientific data or think critically.
Textbooks	Berg JM, Tymoczko JL, Stryer L (2007) Biochemistry, 6th ed. W.H. Freeman, New York. Nicholl DST (2008) An Introduction to Genetic Engineering, 3rd ed. Cambridge University Press, Cambridge. Zubay GL (1998) Biochemistry, 3rd ed. Wm. C. Brown Publishers, Dubuque, Iowa.	
References	Turner PC et al. (2000) Molecular Biology. The Instant Notes Series. BIOS, Oxford. Krebs JE, Goldstein ES, Kilpatrick ST (2011) Lewin's Genes X. Jones and Bartlett, Mass.	

BIOC2601 Metabolism (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	60
Course Co-ordinator	Dr N S Wong, Biochemistry		
Course Aim	This course aims to provide the basic concepts of metabolism: the events and their importance in relation to the survival of living organisms. Taken together with BIOC1001 and BIOC2602, this will lay the foundation for the more advanced courses offered in the Biochemistry discipline.		
Course Contents	This course focuses on the central metabolic pathways involved in the provision of energy needed by living organisms. Major metabolic pathways covered in this course include those that are involved in the synthesis and breakdown of glucose, glycogen, triacylglycerol, and amino acids. The metabolism of purines and pyrimidines will also be considered. Emphasis is on the understanding of the metabolic reactions involved and how they are regulated in relation to environmental cues. Metabolic derangements as a basis of diseases will also be discussed.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain the significance of individual steps in a metabolic pathway; - recognize the importance and the need for regulation of metabolic pathways; - discuss the roles of enzymes in the regulation of metabolic pathways; - describe how metabolic process are integrated under different physiological and pathological conditions.		
Pre-requisites	Pass in BIOC1001 or BIOL1125		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 6 tutorials		
Assessment Method	One 2-hour written examination (80% weighting) and coursework (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Displays a strong analytical ability and logical thinking and is able to apply knowledge to a wide range of complex situations. Consistently able to communicate sophisticated ideas confidently and clearly. B: Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of analytical ability and logical thinking and is sometimes able to apply knowledge to complex situations. Often communicates complex ideas clearly. C: Demonstrates general but incomplete knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of some analytical ability and logical thinking and is sometimes able to apply knowledge to familiar or uncomplicated situations. Sometimes communicates ideas clearly. D: Demonstrates limited knowledge and skills required for attaining some of the course learning outcomes. Shows poor analytical ability and logical thinking and is rarely able to apply knowledge to solve problems. Has difficulty in expressing ideas coherently. Fail: Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks analytical ability and logical thinking and is unable to apply knowledge to solve problems. Ineffective at communicating ideas.		
References	Berg JM, Tymoczko JL, Stryer L (2007) Biochemistry, 6th ed. W.H. Freeman, New York. Devlin TM (2006) Textbook of Biochemistry: with Clinical Correlations, 6th ed. Wiley-Liss, Hoboken, New Jersey. Nelson DL, Cox MM (2008) Lehninger Principles of Biochemistry, 5th ed. W.H. Freeman, New York.		

BIOC2602 Understanding metabolic diseases (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	40
Course Co-ordinator	Dr L Y L Cheng, Biochemistry		
Course Aim	To strengthen students' understanding of metabolism. By using a problem-based learning (PBL) approach, students are trained in critical thinking and problem-solving skills. Students will be able to grasp the major effects on metabolic integration and control and they can use these concepts with greater confidence and success in approaching new problems and new areas of study.		
Course Contents	Knowledge of major pathways is applied to the understanding of disease mechanisms. The first part of the course will be delivered in the form of lectures, case presentations, etc. and supplemented with audio-visual aids to illustrate the major concepts of metabolic diseases. The second half of the course will be delivered in a tutorial format in which students are given cases to analyse and search for solutions through references. Metabolic		

	disturbances which lead to diseases will be discussed.		
Learning Outcomes	On successful completion of this course, students should be able to: - apply the knowledge of major metabolic pathways to the understanding of disease mechanisms; - illustrate the major concepts of metabolic diseases and discuss the metabolic disturbances in diseases; - explain the importance of metabolic integration and control; - develop critical thinking, problem-solving and presentation skills.		
Pre-requisites	(Pass in BIOC1001 or BIOL1125 or BIOL1514); and (Pass in BIOC2601, or already enrolled in this course).		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	18 x 1-hour lectures plus 4 x 3-hour PBL tutorials		
Assessment Method	One 2-hour written examination (50% weighting) plus continuous assessment in tutorials (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Shows strong analytical ability and logical thinking in the critique of scientific data and is able to apply knowledge to a wide range of complex situations. Presents ideas clearly and coherently and collaborates proactively with peers. B: Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of analytical ability and logical thinking in the critique of scientific data and is often able to apply knowledge to a wide range of complex situations. Presents ideas coherently and collaborates effectively with peers. C: Demonstrates general but incomplete knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of some analytical ability and logical thinking in the critique of scientific data and is sometimes to apply knowledge to familiar situations. Has difficulty in presenting ideas coherently and collaborates passively with peers. D: Demonstrates partial but limited knowledge and skills required for attaining some of the course learning outcomes. Shows poor analytical ability and logical thinking in the critique of scientific data and is rarely able to apply knowledge to solve problems. Lacks clarity when presenting ideas and reluctantly collaborates with peers. Fail: Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks of analytical ability and logical thinking in the critique of scientific data and is unable to apply knowledge to solve problems. Incoherent presentation skills and unable to collaborate with others.		
Textbooks	None prescribed		

BIOC2603 Principles of molecular genetics (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	60
Course Co-ordinator	Dr M H Sham, Biochemistry		
Course Aim	To provide basic knowledge on molecular genetics, illustrating modern concepts with current experimental approaches and computer-assisted programmes. Together with BIOC3613 and BIOC3609, a comprehensive background on molecular genetics is provided for advanced study and/or research in molecular biology.		
Course Contents	Genomes. Control of gene expression. Genetic recombination and transposition. RNA processing. Introns & exons. Genetic engineering and applications. DNA polymorphism. Single nucleotide polymorphisms		
Learning Outcomes	On successful completion of this course, students should be able to: - illustrate the mechanisms of prokaryotic gene expression controls using bacterial and viral examples; - describe eukaryotic RNA processing, intron splicing and RNA editing mechanisms; - describe the basic principles of DNA recombination and the mechanisms of transposition; - apply their understanding of sequence variations and polymorphisms in the human genome on disease gene mapping; - integrate basic knowledge on transcription, translation and control of gene expression and apply the knowledge on genetic engineering.		
Pre-requisites	Pass in BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; tutorial may be scheduled		
Assessment Method	One 2-hour written examination (80% weighting) and coursework (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Shows strong analytical ability and logical thinking in the critique of scientific data and is able to apply knowledge to a wide range of complex situations. Presents ideas clearly and coherently, with confidence. B: Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of analytical ability and logical thinking in the critique of scientific data and is often able to apply knowledge to a wide range of complex situations. Presents ideas coherently. C: Demonstrates general but incomplete knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of some analytical ability and logical thinking in the critique of scientific data and is sometimes to apply knowledge to familiar situations. Sometimes has difficulty in presenting ideas coherently. Demonstrates partial but limited knowledge and skills required for attaining some of the course learning outcomes. Shows poor		

	D	analytical ability and logical thinking in the critique of scientific data and is rarely able to apply knowledge to solve problems. Lacks clarity when presenting ideas.
	Fail	Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks of analytical ability and logical thinking in the critique of scientific data and is unable to apply knowledge to solve problems. Incoherent when presenting ideas.
Textbooks	Nicholl DST (2008) An introduction to Genetic Engineering, 3rd ed. Cambridge University Press, Cambridge. Watson JD et al. (2008) Molecular Biology of the Gene, 6th ed. Pearson/Benjamin Cummings, San Francisco.	
References	Griffiths AJF et al. (2008) Introduction to Genetic Analysis, 9th ed. W.H. Freeman and Co., New York. Weaver RF (2008) Molecular Biology, 4th ed. McGraw-Hill, Boston.	

BIOC2604 Essential techniques in biochemistry and molecular biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	60
Course Co-ordinator	Dr K M Yao, Biochemistry		
Course Aim	To give students a general overview of different experimental approaches and model systems, and to provide students with hands-on experience in basic biochemical and molecular techniques.		
Course Contents	Basic concepts in experimental science; writing of lab notebooks; experimental approaches - genetic, biochemical, molecular, genomic and others; methods for isolation and analysis of carbohydrates, proteins, lipids and nucleic acids; subcellular fractionation; enzyme assays and spectrophotometry; basic nucleic acid manipulation - PCR, site-directed mutagenesis, blotting and hybridization, cloning strategies, restriction mapping.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the basic principles of various biochemical and molecular techniques; - describe different experimental approaches for achieving defined experimental aims; - apply different techniques to biochemical and molecular analyses; - write and maintain a scientific laboratory notebook satisfactorily.		
Pre-requisites	Pass in BIOC1001 or BIOC1003 or BIOL1102 or BIOL1122 or BIOL1125 or BIOL1106 or MEDE0001		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	12 x 1 hour lectures; 12 x 5 hour practicals with pre-lab and post-lab discussions		
Assessment Method	One 2.5-hour written examination (50% weighting) plus course work and lab report assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Shows strong analytical ability and logical thinking, with evidence of original thought. Competently conducts laboratory skills and techniques with confidence and can critically appraise data to draw appropriate and insightful conclusions. B: Demonstrates substantial knowledge and skills required for attaining most of the course learning outcomes. Shows evidence of critical thinking and analytical skills. Conducts laboratory skills and techniques with confidence and can appraise data to draw appropriate conclusions. C: Demonstrates general but incomplete knowledge and skills required for attaining most of the course learning outcomes. Shows some evidence of critical thinking and analytical skills. Conducts laboratory skills and techniques to a satisfactory level of competence and can sometimes correctly appraise data and draw appropriate conclusions. D: Demonstrates partial but limited knowledge and skills required for attaining some of the course learning outcomes. Shows limited critical thinking and analytical skills. Displays poor laboratory skills and techniques and is rarely able to use data to draw appropriate conclusions. Fail: Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks analytical ability and logical thinking. Displays ineffective lab skills and techniques and is unable to use data to draw appropriate conclusions.		
Textbooks	Scopes RK (1994) Protein Purification: Principles and Practice. Springer Advanced Texts in Chemistry, Springer-Verlag, New York. Wilson K, Walker KM (2005) Principles and Techniques of Biochemistry and Molecular Biology. Cambridge University Press, Cambridge. Watson JD (1992) Recombinant DNA. Scientific American Books, New York.		
References	Alberts B et al (2007) Molecular Biology of the Cell, 5th ed. Garland Science, New York.		

BIOC2616 Directed studies in biochemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	45
Course Co-ordinator	Dr J D Huang, Biochemistry		
Course Aim	To enhance students knowledge of a particular topic and the students self-directed learning and critical thinking skills.		
Course Contents	The student undertakes a self-managed study on a topic in biochemistry under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject. A laboratory or field study that would enhance the student's understanding of the subject may also be involved.		
Learning Outcomes	On successful completion of this course, students should be able to:		

	- critically appraise research literature in a specific area of biochemistry and molecular biology; - examine the theoretical or experimental basis for existing concepts; - identify questions and evaluate issues for further research development.		
Pre-requisites	This course is for Biochemistry major students only; and Not for students who have passed in BIOC3614, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Discussion meetings to be arranged by the student and the supervisor. The student is expected to spend at least 50 hours on the project.		
Assessment Method	Dissertation (50% weighting) in the form of a report with 6000-8000 words (exclusive of figures and references); Continuous assessment (30% weighting); Oral presentation of a poster (20% weighting).		
Course Grade	A+ to F		
Grade Descriptors			

A	Produces a sophisticated and detailed appraisal of the biochemical literature, displaying a comprehensive and deep understanding of the selected topic. Able to contextualize all the ideas within a personal framework of knowledge and evaluate relevant issues emerging from the study. Works proactively with a supervisor to enhance understanding and scientific writing skills. Communicates the findings to a broader audience in an effective way and responds knowledgeably to questions. Excellent time-management skills and able to reflect honestly on one's own learning.
B	Produces a coherent appraisal of the biochemical literature, displaying a sound understanding of the selected topic. Able to contextualize many of the ideas within a personal framework of knowledge and identify some relevant issues emerging from the study. Works constructively with a supervisor to enhance understanding and scientific writing skills. Clearly communicates the findings to a broader audience and responds knowledgeably to most questions. Able to time-manage effectively and reflect on one's own learning.
C	Produces a reasonable appraisal of the biochemical literature, displaying an adequate understanding of the selected topic. Able to contextualize a few of the ideas within a personal framework of knowledge and makes some attempt to identify some relevant issues emerging from the study. Works with a supervisor and other co-workers to improve understanding and scientific writing skills. Communicates the findings to a broader audience with reasonable clarity and responds to most questions. Acceptable time-management and self-reflection skills.
D	Produces a superficial appraisal of the biochemical literature, displaying a limited understanding of the selected topic. Able to contextualize a few of the ideas within a personal framework of knowledge but unable to identify any relevant issues emerging from the study. Works reluctantly with a supervisor and other co-workers to develop understanding and scientific writing skills. Displays weak communication skills when presenting the findings to a broader audience. Poor time-management and self-reflection skills.
Fail	Fails to appraise the biochemical literature and thus unable to display any understanding of the selected topic. Unable to contextualize the ideas within a personal framework of knowledge or identify any relevant issues emerging from the study. Works in isolation, thus failing to make progress in understanding and scientific writing skills. Unable to communicate effectively when presenting the findings to a broader audience. No time-management skills or ability to self-reflect.

BIOC3608 Sequence bioinformatics (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	60
Course Co-ordinator	Dr B C W Wong, Biochemistry		
Course Aim	This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequences using bioinformatics tools available on the World Wide Web.		
Course Contents	This course will introduce and discuss the following topics: DNA and protein sequence database, protein family databases; information searching and retrieval - Entrez and SRS; Simple sequence analysis; sequence alignment: pair-wise alignment, multiple sequence alignment, substitution matrices; sequence database searching: algorithm and parameters; sequence patterns and motifs, and profiles; phylogenetic analysis; gene prediction.		
Learning Outcomes	On successful completion of this course, students should be able to: - search and retrieve sequence information from biological databases; - describe the algorithms for pairwise and multiple alignments, BLAST search, and phylogenetic trees construction; - perform sequence analysis using EMBOSS package and other web-based analysis tools; - interpret results from sequence alignments and BLAST database searches - use results from various sequence analysis tools to annotate a biological sequence.		
Pre-requisites	Pass in BIOC2603 or BIOL2303 or BIOL3308 or MEDE0001		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 12 tutorials may be scheduled		
Assessment Method	One 2-hour written examination (70% weighting) and coursework (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

A	Demonstrates thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes; strong critical thinking; excellent ability to apply bioinformatics skills in a range of context.
B	Demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes; evidence of critical thinking; good ability to apply bioinformatics skills in a range of context.
C	Demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcome; some critical thinking; adequate ability to apply bioinformatics skills in a range of context.
D	Demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes; limited critical thinking; limited ability to apply bioinformatics skills in a range of context.
Fail	Demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes; lack of critical thinking; little or no ability to apply bioinformatics skills in a range of context.

Textbooks	Baxevanis AD, Ouellette BFF (2005) Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, 3rd

	ed. Wiley, Hoboken, N.J. Mount DW (2004) Bioinformatics: Sequence and Genome Analysis, 2nd ed. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.

BIOC3609 Molecular medicine (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	50
Course Co-ordinator	Dr D Y Jin, Biochemistry		
Course Aim	To provide up-to-date knowledge of the molecular and genetic basis of human diseases including cancer, thereby preparing the students for a career in medical molecular biology, biotechnological, pharmaceutical and genome research.		
Course Contents	This course is divided roughly into three related sections: an introduction to human molecular genetics, molecular basis of cancer and viral diseases, and molecular therapeutics. Specific topics may include genetic variation and human diseases, multifactorial disorders, linkage and association, positional cloning, identification of disease genes, molecular basis of genetic diseases, mouse model of human diseases, oncogenes and tumor suppressor genes, genome instability, HIV science, genetics and pathogenesis of influenza viruses, molecular approaches to vaccine development, stem cells, gene therapy, and nucleic acid therapeutics. Basic knowledge of molecular genetics and molecular biology is assumed before taking this course.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the molecular genetic principles underlying human genetic diseases; - explain the molecular mechanisms underlying cancers and viral diseases - illustrate the application of molecular biology in medicine with examples; - integrate and translate their knowledge in molecular biology to new approaches in disease prevention and management.		
Pre-requisites	Pass in BIOC2603 or BIOL2303		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; tutorials may be scheduled		
Assessment Method	One 3-hour examination (80% weighting) plus a class test (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A	Displays a comprehensive grasp of the key concepts underlying the molecular basis of human disease and is able to articulate clearly how this knowledge can lead to effective treatment strategies. Evidence of strong analytical and critical thinking when dealing with complex scientific data.	
	B	Displays a substantial and near-complete grasp of the key concepts underlying the molecular basis of human disease and is able to relate this knowledge to effective treatment strategies. Able to apply analytical and critical thinking skills when dealing with scientific data.	
	C	Displays a general understanding of the key concepts underlying the molecular basis of human disease and is sometimes able to relate this knowledge to effective treatment strategies. Sometimes able to apply analytical and critical thinking skills when dealing with scientific data.	
	D	Displays a limited understanding of the key concepts underlying the molecular basis of human disease and is rarely able to relate this knowledge to effective treatment strategies. Evidence of weak analytical and critical thinking skills when dealing with scientific data.	
	Fail	Displays an incorrect or incomplete understanding of the key concepts underlying the molecular basis of human disease and is unable to relate this knowledge to effective treatment strategies. No evidence of analytical or critical thinking skills when dealing with scientific data.	
Textbooks	Strachan T, Read AP (2004) Human Molecular Genetics 3. Garland Science, London. Vogelstein B, Kinzler K (ed.) (2002) The Genetic Basis of Human Cancer, 2nd ed. McGraw-Hill, New York. Knipe DM, Howley PM (ed.) (2007) Fields Virology, 5th ed. Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia.		

BIOC3610 Advanced biochemistry I (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	50
Course Co-ordinator	Dr K M Yao, Biochemistry		
Course Aim	This course aims at providing students an in-depth understanding of fundamental principles applicable in modern biochemistry. This course is particularly useful for students interested in research or intending to develop a career in biomedical sciences.		
Course Contents	Topics covered include inter- and intracellular signal transduction mechanisms, mechanisms and significance of post-translational modifications of proteins, and the forms and functions of complex carbohydrates.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the molecular and cellular signal transduction mechanisms and information transfer; - illustrate the controls of the metabolic and cellular regulation based on their understanding of co- and post-translational modification mechanisms; - develop critical thinking and analytical skills.		
Pre-requisites	Pass in (BIOC1001 and BIOL2301 and (BIOC2601 or BIOL2115))		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		

Teaching Hours	Lectures: 24 hours; tutorials may be scheduled
Assessment Method	One 3-hour written examination (70% weighting) and continuous assessment based on written assignments (30% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Demonstrates thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes; shows strong critical thinking and analytical skills, with evidence of original thought and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. B: Demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes; shows evidence of critical thinking and analytical skills and ability to apply knowledge to familiar and some unfamiliar situations. C: Demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes; shows evidence of critical thinking and analytical skills and ability to apply knowledge to familiar and some unfamiliar situations. D: Demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes; show evidence of some critical thinking, but with limited analytical skills and shows limited ability to apply knowledge to solve problems. Fail: Demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes; lack of critical thinking and analytical skills and no ability to apply knowledge to solve problems.
Textbooks	Lodish H et al (2008) Molecular Cell Biology, 6th ed. Freeman, New York. Alberts B et al (2010) Essential Cell Biology, 3rd ed. Garland Science, New York.
References	None prescribed

BIOC3611 Advanced biochemistry II (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	50
Course Co-ordinator	Dr D Chan, Biochemistry		
Course Aim	This course is aim at providing students with an up-to-date knowledge of protein biochemistry from sequence to structure and disease; realizing the importance of kinetics in cellular function and an appreciation of the technological advances in the characterization of macromolecules.		
Course Contents	Topics including protein folding and misfolding in diseases; conformation of proteins and the role of conformational changes in protein function; catalytic mechanisms of enzymes and enzyme kinetics; biomolecular interactions; characterization of macromolecules using X-ray crystallography, nuclear magnetic resonance and other spectroscopy methods; protein engineering and therapeutic approaches targeting protein function.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe how protein structures inform functions; - recognize the roles of enzyme kinetics in cellular functions; - derive structural information of macromolecules from experimental data; - apply their knowledge on protein engineering and therapeutics, and on experimental designs in basic and applied research.		
Pre-requisites	Pass in BIOC2601 and BIOL2301; and Pass in BIOC3610, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	Lectures: 24 hours: tutorials may be scheduled		
Assessment Method	One 3-hour written examination (70% weighting) and continuous assessment based on written assignments (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Clear and insightful description of how protein structure informs function; clear evidence of ability to recognize mechanisms of enzyme function and interpretation of data; effectual demonstration of applying knowledge to the design of scientific methodologies and cohesive, systematic and creative organization of information for presentation and communication. B: Clear description of how protein structure informs function; evidence of ability to recognize mechanisms of enzyme function and interpretation of data; capable demonstration of applying knowledge to the design of scientific methodologies; and cohesive and systematic organization of information for presentation and communication. C: Awareness of how protein structure informs function; some evidence of ability to recognize mechanisms of enzyme function and interpretation of data; some capable demonstration of applying knowledge to the design of scientific methodologies and systematic organization of information for presentation and communication. D: Superficial awareness of how protein structure informs function; limited evidence of ability to recognize mechanisms of enzyme function and interpretation of data; superficial demonstration of applying knowledge to the design of scientific methodologies and limited organizational skill of information for presentation and communication. Fail: Lack of awareness of how protein structure informs function; lack of ability to recognize mechanisms of enzyme function and interpretation of data; superficial demonstration of applying knowledge to the design of scientific methodologies; insufficient organizational skill of information for presentation and communication.		
Textbooks	Fersht A (1999) Structure and Mechanism in Protein Science: A Guide to Enzyme Catalysis and Protein Folding. W.H. Freeman, New York. Miller AD & Tanner JA (2008) Essentials of Chemical Biology: Structure and Dynamics of Biological Macromolecules. John Wiley & Sons, Chichester, England; Hoboken, NJ.		
References	To be given.		

BIOC3613 Molecular biology of the gene (6 credits)		**Academic Year**	**2012**

Offering Department	Biochemistry	**Quota**	50
Course Co-ordinator	Prof K S E Cheah, Biochemistry		
Course Aim	To provide an up-to-date knowledge of molecular biology, especially with respect to the regulation of eukaryotic gene expression and molecular embryology.		
Course Contents	This is a comprehensive course covering many detailed molecular aspects of gene regulation and gene function. Through this course, an understanding of how gene expression can be regulated at levels of transcription and post transcription will be gained.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the mechanisms for regulation of transcription, RNA processing and translation in eukaryotes; - explain how cellular homeostasis can be maintained by a combination of controls of gene expression at multiple levels; - illustrate the hierachy of gene expression regulation in multicellular developmental processes; - interpret experimental results in gene regulation studies.		
Pre-requisites	Pass in BIOC2603 or BIOL2303 or BIOL3308		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; tutorial may be scheduled		
Assessment Method	One 3-hour written examination (80% weighting) plus written assignments (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrates a deep and comprehensive understanding of the regulation of eukaryotic gene expression and its relevance to disease and effectively relates the knowledge to multicellular developmental processes. Uses skill and insight to analyse and interpret experimental data from gene regulation studies. B: Demonstrates a competent grasp of the key concepts in the regulation of eukaryotic gene expression and its relevance to disease and is able to link the knowledge to multicellular developmental processes. Correctly analyses and interprets experimental data from gene regulation studies. C: Demonstrates a basic understanding of the regulation of eukaryotic gene expression and its relevance to disease and is sometimes able to relate the knowledge to multicellular developmental processes. Displays a limited capacity to analyse and interpret experimental data from gene regulation studies. D: Demonstrates a simplistic knowledge of the regulation of eukaryotic gene expression and rarely relates the information to multicellular developmental processes. Displays weak analytical skills and is rarely able to interpret experimental data from gene regulation studies. Fail: Demonstrates incomplete or incorrect knowledge of the regulation of gene expression and is unable to relate the ideas to multicellular developmental processes. Unable to analyse or interpret experimental data from gene regulation studies.		
Textbooks	Alberts B et al. (2007) Molecular Biology of the Cell, 5th ed. Garland Science, New York. Lewin B (2008) Genes IX. Jones and Bartlett Publishers, Sudbury, Mass. Watson JD et al. (2008) Molecular Biology of the Gene, 6th ed. Pearson/Benjamin Cummings, San Francisco.		

BIOC3614 Biochemistry project (12 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	15
Course Co-ordinator	Dr N S Wong, Biochemistry		
Course Aim	To enable students to acquire the basic skills in scientific research: literature search, critical reasoning, communication, teamwork and time management. The course is particularly useful for those students who intend to pursue a career in life science.		
Course Contents	Project-related topics in biochemistry, cell and molecular biology. Experimental methods in protein and nucleic acid biochemistry; bioinformatics and cell biology. Critical appraisal of current science literature Formulation of research questions Design of experiments. Data analysis and interpretation. Scientific writing		
Learning Outcomes	On successful completion of this course, students should be able to: - describe recent research development in a defined area of biochemistry and molecular biology; - formulate research questions and design experiments to address these questions; - apply appropriate experimental techniques to solve research problems; - manage and interpret experimental results; - develop scientific writing skills and logically report their research findings.		
Pre-requisites	Pass in BIOC1001 and BIOC2604; and Pass in BIOC3610, or already enrolled in this course; and Pass in BIOC3611, or already enrolled in this course; and Pass in BIOC3615, or already enrolled in this course; and Not for students who have passed in BIOC2616, or have already enrolled in this course.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	By actively participating in a research project in molecular life sciences, under the supervision of an academic staff		
Assessment Method	Dissertation (60% weighting). Continuous assessment (15% weighting). Oral presentation (25% weighting).The dissertation must be submitted on the date as specified in the examination timetable. The oral presentation is to be given in early June.		

Course Grade	A+ to F	
Grade Descriptors	A	Plans and executes a sophisticated and imaginative experimental investigation, framing the research question within existing knowledge. Displays tenacity and commitment, generating a meaningful body of data that is analysed with insight and comprehensively evaluated in the context of the original research question. Works proactively with a supervisor and other co-workers to enhance practical and scientific writing skills. Communicates the findings to a broader audience in an effective way and responds knowledgeably to questions. Excellent time-management skills.
	B	Plans and executes a detailed experimental investigation, framing the research question within existing knowledge. Works with commitment, generating a sufficient body of data that is analysed and evaluated in the context of the original research question with skill and understanding. Works constructively with a supervisor and other co-workers to enhance practical and scientific writing skills. Clearly communicates the findings to a broader audience and responds knowledgeably to most questions. Able to time-manage effectively.
	C	Plans and executes an experimental investigation, attempting to contextualize the research question. Works with adequate commitment in order to generate sufficient data for a reasonable analysis and evaluation in the context of the original research question. Works with a supervisor and other co-workers to improve practical and scientific writing skills. Communicates the findings to a broader audience with reasonable clarity and responds to most questions. Acceptable time-management skills.
	D	Plans and executes a rudimentary experimental investigation, showing a limited ability to contextualize the research question. Displays minimal commitment when collecting data and is only able to undertake a superficial analysis and evaluation. Works reluctantly with a supervisor and other co-workers to develop practical and scientific writing skills. Displays weak communication skills when presenting the findings to a broader audience. Poor time-management skills.
	Fail	Plans and executes a flawed or simplistic experimental investigation, which lacks a valid scientific context. Shows no commitment when collecting data and produces an incoherent analysis and evaluation. Works in isolation, thus failing to improve practical and scientific writing skills. Displays weak communication skills when presenting the findings to a broader audience. No time-management skills.
Textbooks	None prescribed	

BIOC3615 Advanced techniques in biochemistry & molecular biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	50
Course Co-ordinator	Dr D Chan, Biochemistry		
Course Aim	This is an advanced experimental-based course for students majoring in Biochemistry and related disciplines. The aim is to provide the necessary training for students to pursue postgraduate research education and for potential employment in a scientific laboratory/industry environment.		
Course Contents	Hands-on experiments using advanced techniques in biochemistry, molecular and cell biology, and bioinformatics. Students will also have the opportunity to familiarize themselves with modern instruments used in life sciences.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain the basic principles of current advanced techniques commonly used in biochemistry and molecular biology; - apply and perform these techniques in other novel experimental settings; - critically evaluate experimental data; - design alternative approaches to test or validate hypotheses; - write a concise experimental report using correct terminologies and nomenclatures.		
Pre-requisites	Pass in (BIOC1001 and (BIOC0002 or BIOC1003) and BIOC2604)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	Lectures: 12 hours; Practicals: 12 x 5 hours with pre-lab and post-lab discussion		
Assessment Method	One 2.5-hour written examination (50% weighting) and continuous assessment (50% weighting) based on laboratory reports, written assignments, and laboratory skills		
Course Grade	A+ to F		

Grade Descriptors	A	Comprehensive and in-depth understanding of the principles and applications of advance technologies in biochemistry; clear and effective ability to identify problems and generate solutions relating to applications in a laboratory setting; clear evidence of ability to evaluate experimental data; cohesive and systematic planning and organization of experimental design and presentation of experimental data.
	B	Comprehensive understanding of the principles and applications of advance technologies in biochemistry; clear ability to identify problems and generate solutions relating to applications in a laboratory setting; evidence of ability to evaluate experimental data; systematic planning and organization of experimental design and presentation of experimental data.
	C	Sound understanding of the principles and applications of advance technologies in biochemistry; sound ability to identify problems and generate solutions relating to applications in a laboratory setting; some evidence of ability to evaluate experimental data; satisfactory planning and organization of experimental design and presentation of experimental data.
	D	Superficial understanding of the principles and applications of advance technologies in biochemistry; limited ability to identify problems and generate solutions relating to applications in a laboratory setting; some awareness of ability to evaluate experimental data; some evidence of planning and organization of experimental design and presentation of experimental data.
	Fail	Lack of understanding of the principles and applications of advance technologies in biochemistry; lack of ability to identify problems and generate solutions relating to applications in a laboratory setting; lack of evidence of ability to evaluate experimental data; insufficient evidence of planning and organization of experimental design and presentation of experimental data.
Textbooks	Wilson K, Walker JM (2005) Principles and Techniques of Biochemistry and Molecular Biology. Cambridge University Press, Cambridge.	

BIOC3988 Biochemistry internship (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	10
Course Co-ordinator	Dr J D Huang, Biochemistry		

Course Aim	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefit to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.		
Course Contents	1. Within the university: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor. 2. Outside the university: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor).		
Learning Outcomes	On successful completion of this course, students should be able to: - recognize the strengths and limitations of their area of training or expertise; - examine the role of science in our society; - acquire problem-solving skills to solve novel and ill-defined problems.		
Pre-requisites	Students are expected to have satisfactorily completed the first two years study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give a presentation on their internship experience. Supervisors are required to assess the students based on their performance during the internship period (in the case of internships outside the university, the Internal Supervisor will assess the student based on the feedback by the External Supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

BIOL0118 Bioethics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Prof F C Leung, Biological Sciences		
Course Aim	The aim is to explore the ethical implications of the latest major advances in biology and medicine.		
Course Contents	The course will discuss research ethic between student and mentor, and ethical implications in recent major advancements in biological and medical sciences. Major areas to be discussed include but are not limited to: genetics, reproduction, disease diagnosis and therapy, development, transplantation, aging, dying, environment, and the use of animals in research. Ethical and moral principles and implications for social framework and public policy raised by these advances will be discussed.		
Learning Outcomes	On successful completion of this course, students should be able to: - be familiar with the current ethical theories, discussions, and arguments taking place in the field of bioethics specifically related to the advancement of modern molecular biology and genomics; - to reflect upon and formulate in a professional manner their own opinions on these matters as well as to understand and enter into a respectful dialogue with those who possess another point of view; - to understand the basis of one's own position, as well as the basis of another person's opinion; - to deal with the quandaries that arise when facing modern medical technology and advancements.		
Pre-requisites	NIL		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures/discussion		
Assessment Method	One 2-hour written examination (about 40% weighting); continuous assessment of essays, presentation and debate exercises (about 60% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

A	Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use communication skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective individual as well as collaborative-based organizational and presentational skills.
B	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective individual as well as collaborative-based organizational and presentational skills.
C	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately individual as well as collaborative-based organizational and presentational skills.
D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate individual as well as collaborative-based organizational and presentational skills of limited effectiveness.
Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness individual as well as collaborative-based organizational and presentational skills.

References	Library & web-based reading materials
Remarks	The course will be offered subjected to a minimum enrollment number.

BIOL0126 Fundamentals of biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	189
Course Co-ordinator	Dr W Y Lui, Biological Sciences		
Course Aim	This course is designed to provide students a general concept of the various disciplines of biology and prepare them for further intermediate and advanced courses in biology. It takes a systematic approach to look at the key principles that govern the survival of life forms.		
Course Contents	The following topics will be included: bacteria and viruses, structure and components of animal cells, food consumption and energy, biosynthesis and growth, chemistry of life, DNA and protein, chromosomes and genes, body defense mechanism, cell-cell communications: from nerve to hormone, cancer and oncogene, sex and reproduction, cell culture and applications, nutrition and health.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic concepts in cell biology such as cellular components, cellular respiration, cell-cell interaction, cell division and cell cycle; - Acquire the basic knowledge on molecular biology including molecular structure of biological molecules, transcription and translation; - Explain how different systems in our body perform their function; - Understand the basic concepts in essential nutrients and energy balance.		
Pre-requisites	E or above in HKCEE Biol; and Not for students with E or above in AL Biol; and Not for students who have passed in BIOL1122, or have already enrolled in this course; and Not for students who have passed in any BIOL2XXX level, or have already enrolled in these courses; and Not for students who have passed in any BIOL3XXX level, or have already enrolled in these courses.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		

Teaching Hours	36 hours of lectures / tutorials
Assessment Method	One 2-hour written examination (80% weighting) and continuous assessment (20% weighting)
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.
Textbooks	TBC
References	Starr C.: Biology - Today and Tomorrow (Thomson, 2007) Alters & Alters: Biology - Understanding Life (Wiley, 2006)
Remarks	The course will be offered subjected to a minimum enrollment number.

BIOL0127 Contemporary nutrition: insights and controversies (3 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr E T S Li, Biological Sciences		
Course Aim	What you eat greatly affects your well-being. Everywhere we go, we are bombarded by different messages, from vitamins to functional food products, on how food components or treatments impact on body functions and health. How reliable is the information from the mass media? Are these facts or myths? This course aims to provide health conscious individuals the basic knowledge to decipher information related to nutrition and health. Such knowledge is essential to the building of good eating habits that could promote health for a lifetime.		
Course Contents	The lectures, tutorial and guided studies will cover: healthy eating-concepts and practice; essential nutrients; dietary supplements; fad diets; weight management - energy intake and expenditure; food additives; and genetically modified foods. To better understand their own body and needs, students will have the chance to assess their own diet and measure body fat content.		
Learning Outcomes	On successful completion of this course, students should be able to: - Distinguish between facts and myths; - Identify quackery diets; - Understand the concept of health promotion; - Match their needs against dietary pattern.		
Pre-requisites	Not for students who have passed in BIOL1514, or have already enrolled in this course; and Not for students who have passed in BIOL2533, or have already enrolled in this course; and Not for students in Food & Nutritional Science Programme / Major / Minor.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	12 lecture, plus 12 hours of guided study		
Assessment Method	One 2-hour written examination (60%) and continuous assessment (40%)		
Course Grade	A+ to F		
Grade Descriptors	A: B: C: D: Fail:		
Textbooks	Whitney E. & Rolfes S.R. Understanding Nutrition (Thomson, 2008)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL0135 Introductory microbiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr V Dvornyk, Biological Sciences		

Course Aim	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	The discovery of microorganisms, their diversity and evolutionary history; Basic aspects of microbial structure and function, physiology and metabolism; Microbial genetics and molecular genetics; Microbial ecology and interactions with animals, plants and the environment; an introduction to the importance of microorganisms in disease and medicine, public health, food production and spoilage, and biotechnology.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the key features of the major microbial phyla and place them in an evolutionary context; - explain the major physiological and genetic processes in prokaryotes and eukaryotic microorganisms and compare the similarites and differences between these two domains; - identify the microorganisms involved and their role in ecological processes, human disease and medicine, food production and spoilage, and biotechnology.		
Pre-requisites	Not for students who have already passed in BIOL0129 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and interactive learning		
Assessment Method	One 2-hour MCQ examination (70% weighting), coursework (30% weighting)		
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. Ideasshow 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.		
References	Madigan MT, Martinko JM & Parker J (2003) Brock Biology of Microorganisms		
Course Website	www.hku.hk/biosch		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL0604 Evolutionary diversity (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Prof R M K Saunders, Biological Sciences		
Course Aim	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	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).		
Learning Outcomes	On successful completion of this course, students should be able to: - Interpret phylogenies in order to understand the relatedness of taxonomic groups and the pattern of evolutionary changes in structures, processes and behaviours. - Describe the characteristics of different evolutionary lineages of plants and animals and recall the names of the main taxonomic groups. - Explain the possible selective advantages of the highlighted structures, processes and behaviours.		
Pre-requisites	NIL		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 36 hours of practical work		
Assessment Method	One 2-hour written assessment (70% weighting), and continuous assessment (30% weighting)		
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.
Textbooks	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.)	
References	TBC	
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol0604/	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL0625 Ecology and evolution (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof D Dudgeon, Biological Sciences		
Course Aim	The interaction between organisms and their environment is addressed using an issue-based approach in order to explains how the ecology of plants and animals has been shaped by evolution through interactions with their living and non-living environment. The course also demonstrates how we can understand and explain the significance of what we see in nature using scientific methods. A field course component provides the opportunity to investigate how the environment influences community composition, biodiversity and adaptive radiation in a variety of habitats.		
Course Contents	The environment influences organisms profoundly. It affects their present-day ecology (determining where they live and how many can survive there) and, through natural selection acting over past generations, influences their form and adaptations. Present day human-induced changes to the environment are also responsible for endangering species and degrading their habitats. This introductory course introduces some basic scientific principles of ecology and evolution, showing how they are linked to the environment by physiological tolerances and evolutionary adaptation which, in turn, lead to specialization and generate biodiversity. Individuals and their interactions will be a major focus of the course together with discussion of population dynamics, community structuring, life histories, and niche dynamics. The principles of ecology and evolution resulting from interaction with the environment will also be demonstrated by describing the origins of modern humans, including our fossil record and relationship to other primates, and the main ecological transformations caused by humans and their environmental impacts. The course will conclude with an account of the importance of biodiversity, and the factors that threaten it globally. Lectures are complemented by a 5-day residential field course during the Reading Week when students visit a variety of HK habitats to study their biodiversity, community composition and the relationship between organisms and their environment.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand how scientific methods (hypotheses, experiments, comparisons) are used to investigate ecological and evolutionary processes. - understand the basic mechanism of natural selection, and how interactions with the environment lead to adaptation and generate biodiversity. - understand that ecology and behaviour can be interpreted in the light of selective pressures from the environment upon individual organisms. - understand the ecological factors influencing evolution, using the human evolutionary tree as an example. - understand the community ecology and biodiversity of selected Hong Kong habitats, and typical adaptations of organisms found there.		
Pre-requisites	NIL		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures. At least 36 hours field and laboratory work, as groups and individuals, plus ~10 hours of lectures during residential field course. Student-centred learning during the semester (~24 hours) in the form of internet tutorials, assigned reading and a laboratory workshop.		
Assessment Method	Final grade will be based on a field course assessment plus a coursework assignment (40%), and an end-of-semester examination (60%).		
Course Grade	A+ to F		

Grade Descriptors		
	A	Evidence of complete or near-complete understanding and a thorough grasp of the subject as demonstrated by attainment of all learning outcomes, and excellent use of named (organism) examples, including local species and habitats. Show excellent organizational, presentational and/or analytical skills and fieldwork techniques. Excellent or outstanding (for A+) work relative to what is required at degree level.
	B	Evidence of substantial understanding and a good grasp of the subject as demonstrated by attainment of the majority of learning outcomes, and use of named (organism) examples, including local species and habitats. Show good organizational, presentational and/or analytical skills and fieldwork techniques. Work more than sufficient for what is required at degree level.
	C	Evidence of general understanding with an adequate (but incomplete) grasp of the subject, as demonstrated by general but incomplete attainment of most of the learning outcomes, with limited use of named (organism) examples. Show fair organizational, analytical, presentational and/or analytical skills and fieldwork techniques. Work sufficient for what is required for degree level.
	D	Evidence of retention of a minimum of relevant information and incomplete understanding of the subject (i.e. knowledge is very incomplete), as demonstrated by partial but limited attainment of learning outcomes. Insufficient familiarity with fieldwork techniques, habitats or organisms. Work merely (for D+) or barely (D) adequate for what is required at degree level.

	Fail	Evidence of poor or inadequate knowledge and understanding of the subject such that the majority of learning outcomes cannot be attained. Little or no evidence of familiarity with fieldwork techniques, habitats or organisms. Work fails to reach degree level.

Textbooks	Boyd, R. & Silk, J.B. (1997) How Humans Evolved (4th Edition). Norton, NY. (5th Edition is available in HKU library as an e-book.) Dawkins, R. (2006) The Blind Watchmaker. Penguin, London. Stiling, P. (2002) Ecology: Theories and Applications (4th Edition). Prentice Hall, Singapore.
References	An up-to-date list of references to the primary scientific literature, background reading and/or internet resources that are relevant to each lecture will be provided on the course website. Useful references for the field course are the Hong Kong Field Guides volumes 1-4 (Rocky Shores, Hillstreams, Hillsides and Sandy Shores), and the following: Dudgeon, D. & Corlett, R.T. (2011) The Ecology and Biodiversity of Hong Kong (Revised Edition). Cosmos Books, Hong Kong.
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol0625/
Remarks	The course will be offered subject to a minimum enrollment number. A compulsory 5-day residential field component during the reading week.

BIOL1120 The gene (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof F C Leung, Biological Sciences		
Course Aim	The objective is to expose students to the impacts of genes to the society. Recent completion of the human genome and many agricultural crops and animals genomes, it brings not only promises of a better quality of life as well as lots of technical and ethical issues/challenges that general public need to deal with. The goal of this course is to open up students from all backgrounds to this basic unit of inheritance called the gene and its impact on various scientific and social disciplines.		
Course Contents	Content/topics include: Introduction and review of basic cell biology Basic genetic - The gene Basic Molecular Biology and Biotechnology - Recombinant DNA and cloning Bacterial Genes - Gene and Environment Human Genes/Human genome - history and its Impacts! Human Genome - The Amazing discovery! Genes and Biotechnology Genes and Disease Genes and Cancer Animal and Plant Cloning Genes and Agricultural/Food Biotechnology Genes and Human Behavior		
Learning Outcomes	On successful completion of this course, students should be able to: - demonstrate understanding and to explain the principle of inheritance, recombinant DNA and cloning. - gain deep understanding about the advancement of biotechnology. - determine and explain the benefits and shortcomings of the application of biotechnology knowledge.		
Pre-requisites	Not for students with E or above in AL Biol; and Not for students who have already passed in BIOL0120 or YSCN0004 or CCST9011 before.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures, 12 tutorials, 48 reading and self-study, 15 essay/report writing, 30 presentation (include preparation)		
Assessment Method	In-class participation and quizzes (10% weighting), essays and written reports (25% weighting), discussion forum (35% weighting), poster and oral presentation (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use communication skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective individual as well as collaborative-based organizational and presentational skills. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective individual as well as collaborative-based organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately individual as well as collaborative-based organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate individual as well as collaborative-based organizational and presentational skills of limited effectiveness. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness individual as well as collaborative-based organizational and presentational skills.		
References	Library & web-based reading materials		
Remarks	The course will be offered subject to a minimum enrollment number. This is a new 6 credits course expanded from former BIOL0120 The gene (3 credits)		

<table>
<tr><td colspan="2">BIOL1122 Functional biology (6 credits)</td><td>Academic Year</td><td>2012</td></tr>
<tr><td>Offering Department</td><td>Biological Sciences</td><td>Quota</td><td>100</td></tr>
<tr><td>Course Co-ordinator</td><td colspan="3">Prof W W M Lee, Biological Sciences</td></tr>
<tr><td>Course Aim</td><td colspan="3">The course is designed to provide an introduction to modern developments in experimental biology through an integrated approach. Life processes will be examined at the molecular, cellular and organismic level.</td></tr>
<tr><td>Course Contents</td><td colspan="3">The following topics will be included: structure and function of macromolecules; mineral nutrition and photosynthesis in plants, influence of plant hormones on plant growth and development; genetics and related topics in molecular biology; cell signaling pathways and the endocrine system; the immune system and viral infections; reproduction; sex determination, sexual behavior and birth control.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="3">On successful completion of this course, students should be able to:
- know the concepts of and interrelations between a variety of biological disciplines including molecular biology, plant physiology, endocrinology, immunology, reproduction and biotechnology;
- explain the connection of such disciplines to life and the application to research investigation;
- prepare and equip themselves for advanced courses (level 2 and level 3) in each of the topics.</td></tr>
<tr><td>Pre-requisites</td><td colspan="3">E or above in AL Biol; or
Pass in BIOL0126, or already enrolled in this course.</td></tr>
<tr><td>Offer in 2012 - 2013</td><td>1st sem 2nd sem</td><td>Examination</td><td>Dec May</td></tr>
<tr><td>Offer in 2013 - 2014</td><td colspan="3">N</td></tr>
<tr><td>Teaching Hours</td><td colspan="3">30 lectures</td></tr>
<tr><td>Assessment Method</td><td colspan="3">One 2-hour written examination (75% weighting) and continuous assessment (25% weighting)</td></tr>
<tr><td>Course Grade</td><td colspan="3">A+ to F</td></tr>
<tr><td>Grade Descriptors</td><td colspan="3"><table>
<tr><td>A</td><td>1. Exceptionally good performance demonstrating comprehensive understanding of the subject matter. 2. Critical insight and analysis into the scientific literatures. 3. Superior writing, presentation and group communication skills.</td></tr>
<tr><td>B</td><td>1. Good performance demonstrating full understanding of the subject matter. 2. Coherent insight and analysis into the scientific literatures. 3. Good writing, presentation and group communication skills.</td></tr>
<tr><td>C</td><td>1. Satisfactory performance demonstrating adequate understanding of the subject matter. 2. Some insight into the scientific literatures. 3. Adequate writing and communication skills.</td></tr>
<tr><td>D</td><td>1. Limited performance demonstrating some understanding of basic subject matter. 2. Some ability to use the scientific literatures. 3. Limited writing and communication skills.</td></tr>
<tr><td>Fail</td><td>1. Poor understanding of subject matter. 2. Little to no insight into use of the scientific literatures. 3. Unable to write or communicate.</td></tr>
</table></td></tr>
<tr><td>Textbooks</td><td colspan="3">Hopkins W.G.: Introduction to Plant Physiology (John Wiley & Sons, 2nd or latest edition)
Bruce A. et al.: Molecular Biology of the Cell (Garland Publishing, N.Y., 2002 or 2008 edition)
Alberts et al.: Essential Cell Biology (Gaxland Publishing, N.Y., 2004 or 2010 edition)
Mader S.S.: Human Reproduction (McGraw Hill, 2005, 3rd edition)</td></tr>
<tr><td>References</td><td colspan="3">TBC</td></tr>
<tr><td>Remarks</td><td colspan="3">The course will be offered subject to a minimum enrollment number.</td></tr>
</table>

<table>
<tr><td colspan="2">BIOL1125 Introduction to biochemistry (6 credits)</td><td>Academic Year</td><td>2012</td></tr>
<tr><td>Offering Department</td><td>Biological Sciences</td><td>Quota</td><td>100</td></tr>
<tr><td>Course Co-ordinator</td><td colspan="3">Dr C S C Lo, Biological Sciences</td></tr>
<tr><td>Course Aim</td><td colspan="3">This course is designed to provide undergraduate (non-biochemistry major) an overview of fundamental concepts in biochemistry as well as hands-on experience in biochemical techniques.</td></tr>
<tr><td>Course Contents</td><td colspan="3">An introduction to various biomolecules in terms of their structures, functions, syntheses and metabolisms, with emphasis on amino acids, proteins, enzymes, carbohydrates, lipids and nucleic acids. The correlations between their biochemical properties and their roles in various life processes will be illustrated.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="3">On successful completion of this course, students should be able to:
- describe the key structural features of carbohydrates, proteins, lipids and nucleotides;
- understand the basic enzyme kinetic properties;
- explain how the common sugars, fatty acids and amino acids are metabolized and synthesized in living cells.</td></tr>
<tr><td>Pre-requisites</td><td colspan="3">(E or above in AL Biol or AL Chem or AS Chem; or Pass in BIOL0126 or CHEM0004 or CHEM0008); and
Not for Students who have passed in BIOC1001, or have already enrolled in this course.</td></tr>
<tr><td>Offer in 2012 - 2013</td><td>1st sem</td><td>Examination</td><td>Dec</td></tr>
<tr><td>Offer in 2013 - 2014</td><td colspan="3">Y</td></tr>
<tr><td>Teaching Hours</td><td colspan="3">24 lectures and 3 laboratory sessions</td></tr>
<tr><td>Assessment Method</td><td colspan="3">One 2-hour written examination (60% weighting), a mid-term examination (30% weighting), and practical assessment (10% weighting)</td></tr>
<tr><td>Course Grade</td><td colspan="3">A+ to F</td></tr>
<tr><td>Grade Descriptors</td><td colspan="3"><table>
<tr><td>A</td><td>Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Integration of the full range of appropriate theories, principles, evidence and techniques</td></tr>
<tr><td></td><td>Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course</td></tr>
</table></td></tr>
</table>

	B	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. General integration of theories, principles, evidence and techniques
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Some partial integration of theories, principles, evidence and techniques
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited integration of theories, principles, evidence and techniques
	Fail	Demonstrate little or 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. Little or no or inapt integration of theories, principles, evidence and techniques
Textbooks	D. L. Nelson and M. M. Cox: Lehninger Principles of Biochemistry (W. H. Freeman and Company, 2005, 4th ed.)	
References	TBC	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL1133 Biological sciences laboratory course (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	110
Course Co-ordinator	Dr W Y Lui, Biological Sciences		
Course Aim	The aim is provide students a comprehensive training in basic laboratory techniques used in modern biological studies. The course will cover a number of techniques used by molecular biologists and microbiologists to conduct scientific research.		
Course Contents	This course will be divided into three modules and each module will have 3 laboratory sessions. Module one: Nucleic acid analysis - DNA & RNA isolation, spectrometry, gel electrophoresis, restriction enzyme analysis and DNA sequence analysis. Module two: Protein analysis - Centrifugation, chromatography and SDS-PAGE electrophoresis. Module three: Microbiology - Microscopy, observation of microorganisms and staining of bacteria, isolation of pure cultures by streaking and serial dilution, enumeration of microbial cells by Petroff-Hausser counting chamber, and turbidity.		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate knowledge in proper use of simple research equipment; - Demonstrate knowledge and understanding of how and why certain techniques are used in a research setting; - Master some basic laboratory techniques for carrying out experiments; - Understand the different ways that microorganisms were categorized according to their size, shape, colour and response to dye etc. and how they were counted.		
Pre-requisites	(E or above AL Biol; or Pass in BIOL0126); and Not for students who have already passed in BIOL0128 before; and Not for students who have already passed in BIOL0132 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	20 hours of lectures and 9 laboratory sessions (4 hours each session)		
Assessment Method	Continuous assessment (100%)		
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. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.	
	B	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.	
	C	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.	
	D	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.	
	Fail	Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.	
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL1514 Nutrition and metabolism (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	150
Course Co-ordinator	Dr E T S Li, Biological Sciences		
Course Aim	To introduce the fundamental concepts of nutrition through an integrated approach in discussing the interactions between diet and intermediary metabolism		

Course Contents	Essential nutrients and their requirements. Energy balance and caloric value of foods. Metabolic control of macronutrient utilization. Nutritional impacts of hexoses, long chain polyunsaturated fatty acids and amino acids. Dietary recommendations.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the concept of nutrient requirements - be able to explain how different organs coordinate to achieve metabolic control of glucose homeostasis - understand the metabolic pathways of various polyunsaturated fatty acids - understand the theoretical constructs of nitrogen requirement and the importance of the urea cycle - be able to assess the impacts of dietary inadequacy		
Pre-requisites	E or above in AL Biol; or Pass in BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	N		
Teaching Hours	24 hours of lectures and 12 hours of tutorials/guided studies		
Assessment Method	One 2 hours written examination (70% weighting), a mid-term test (15% weighting) and coursework (15% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show exceptional ability on knowledge integration, problem identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective organization / writing skills. B: Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective organization / writing skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Might show misunderstanding of the materials. Show some ability on knowledge integration, problem identification and solving. Show some ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate adequate organization / writing skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate basic organization / writing skills. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriously deficient in ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization / writing skills.		
Textbooks	Frayn K.N. Metabolic regulation: A Human Perspective. Wiley-Blackwell, 2010 Champe P.C., Harvey R.A. & Ferrier D.R. Lippincott's Illustrated Reviews: Biochemistry. Lippincott, 2008 Gibney M.J., Macdonald I.A. & Roche H.M. Nutrition & Metabolism. Blackwell Science, 2003		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL1528 Food chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	110
Course Co-ordinator	Dr J C Y Lee, Biological Sciences		
Course Aim	To provide a basic understanding of chemistry in food systems, and to provide practical training in chemistry related to food science and nutrition.		
Course Contents	The course will cover fundamental and relevant chemistry and functionality of major and minor food constituents including water, proteins, carbohydrates and lipids, and minor components such as enzymes, vitamins, minerals, colorants, flavorants and additives. The physical and chemical properties of these important constituents of foods are covered in detail, and form the basis for understanding the reactions which occur during the production, processing, storage and handling of foods, and in understanding the methods used in analyzing foods. A series of laboratory sessions will cover analysis of food components, protein chemistry, lipid oxidation, properties of sugars and starches, enzymatic and non-enzymatic browning reactions, and sensory analysis of foods.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the functions and properties of major and minor food components. - Understand the basic chemistry behind food processing. - Have integrated their knowledge of biological and chemical principles into a food science and nutrition context.		
Pre-requisites	(E or above in AL or AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have already passed in BIOL1123 before; and Not for students who have already passed in BIOL1513 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 18 hours laboratory sessions		
Assessment Method	One 2-hour written examination (80% weighting) and course work assessment (20% weighting)		
Course Grade	A+ to F		

Grade Descriptors	A	Demonstrate thorough grasp of the subject matter covered. Show extensive knowledge and understanding of the topics covered and can readily apply this knowledge. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.
	B	Demonstrate substantial grasp of the subject matter covered. Show thorough knowledge and understanding of the content and a high level of competence in the topics covered and able to apply this knowledge and skills to most situations. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions.
	C	Demonstrate general but incomplete grasp of the subject matter covered. The student has a sound knowledge and understanding of the main areas of content and has achieved an adequate level of competence in the topics covered. Use lab skills and techniques and analysis of data and results to draw moderately appropriate conclusions.
	D	Demonstrate partial but limited grasp, with retention of some relevant information of the subject matter covered. Show a basic knowledge and understanding of the content and has achieved a limited level of competence in the topics covered. Use lab skills and techniques and analysis of data and results to draw appropriate conclusions occasionally.
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show elementary knowledge and understanding in few areas of the content and has achieved very limited competence in some of the topics covered. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions.
Textbooks	Fennema OR, Food Chemistry (Marcel Dekker 4th Ed, 2008) Belitz HD, Grosch W, Schieberle, P, Food Chemistry (Springer 4th Ed, 2009)	
References	TBC	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL1608 Biostatistics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr K M Y Leung, Biological Sciences		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - Formulate biological questions into statistical questions - Design experiments effectively - Make quantitative estimation of biologically meaningful parameters - Use EXCEL and SPSS to carry out most of the statistical computations - Understand the assumptions of commonly used statistical methods; and - Think critically.		
Pre-requisites	Pass in BIOL0625		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 40 hours of computer laboratory/tutorial/projects		
Assessment Method	One 2-hour open-book examination (50% weighting) and course assignments/projects/quizzes (50% weighting)		
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.
Textbooks	Zar, J. H.: Biostatistical Analysis (Prentice-Hall / Englewood Cliffs, N.J., 1999, 4th edition)	
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol1608/	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2109 Economic botany (6 credits)		Academic Year	2012
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Dr C S C Lo, Biological Sciences		
Course Aim	This course provides an understanding and appreciation of plants that are economically important to human. Students are expected to become scientifically knowledgeable on the plants and plant products they encounter everyday. It also aims to make them functionally literate with respect to plant species that are found locally.		
Course Contents	This course offers a scientific study of interactions between plants and human activities. Topics include the manipulation of plants by people, origin of agriculture, methods of plant propagation, major plant families as food (e.g. cereals and legumes), stimulating beverages (coffee and tea) and alcoholic beverages, plant fibers and wood, plant oils and waxes, herbs, spices and perfumes, etc. Students will be trained to recognize the common native, cultivated, ornamental, and exotic plants growing in Hong Kong. Knowledge in Chinese language will be helpful for the learning of local flora identification.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe and appreciate the roles of plants in their daily lives - discuss the scientific principles underlying the reproduction and propagation of economic plants and the production of plant-derived products - recognize an appreciable number of plant species locally and describe their unique botanical features and application values - utilize appropriate tools and resources for plant identification		
Pre-requisites	Pass in BIOL0126 or BIOL0604 or BIOL1122 or BIOL1528		
Offer in 2012 - 2013	Not offered	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 36 hours of laboratory sessions, case studies and field trips		
Assessment Method	One 2-hour written paper (50% weighting) together with laboratory and case study assessments (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A B C D Fail		
Textbooks	B. B. Simpson and M. C. Ogorzaly: Economic Botany (Boston: McGraw-Hill, 2001)		
References	Selected readings to be distributed in class		
Course Website	http://web.hku.hk/~clivelo/2109.htm		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2111 Molecular microbiology (6 credits)		Academic Year	2012
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr J S H Tsang, Biological Sciences		
Course Aim	This course is intended for biology, biotechnology and biochemistry students who would like to understand the modern fundamentals of microbiology. At the end of the course the students are expected to know the physiological, biochemical and molecular aspects of microbiology.		
Course Contents	The basic biochemistry of microorganisms will be described. The intrinsic factors that affect the growth of microbes in the environment will be examined. The adaptation of the microbes to the environment by means of physiological changes and genetical alterations will be illustrated. The molecular biology of bacteria and viruses will be considered. The molecular biology of plasmids and transposable elements and their association with medical aspect will be discussed. The use of modern technology in studying microorganisms will be explored.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the intrinsic reorganization of microbes in response to the changing environments; - Comprehend the major modes of regulation in the microbe; - Explain the biology of bacteriophages and plasmids; - Realize the importance of transposable elements in the survival of the microbes; - Appreciate the development of modern techniques in studying microorganisms.		
Pre-requisites	Pass in BIOL0126 or BIOL0129 or BIOL1122		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures and 30 hours of laboratory sessions/student centered activity.		
Assessment Method	One 2-hour written examination (70% weighting) and course work assessment (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking,		

	A	with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Demonstrate substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Textbooks	TBC	
References	Maloy S.R., Cronan J.E. & Freifelder D. Microbial Genetics (Jones & Bartlett 1994, 2nd ed.) Willey, Sherwood & Woolverton: Prescott's Principles of Microbiology (McGraw Hill 2009) Watson, Baker, Bell, Gann, Levine & Losick: Molecular Biology of the Gene (CSHL Press 2008, 6th ed.) Madigan, Martinko, Dunlap & Clark: Brock Biology of Microorganisms (Pearson 2009, 12th ed.)	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2112 Plant physiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	100
Course Co-ordinator	Dr W K Yip, Biological Sciences		
Course Aim	To give an understanding of plant processes such as plant growth and development and their regulatory mechanisms.		
Course Contents	Discovery, assay, chemical nature, metabolism, structure-activity relationships, physiological effects, and signal transduction of plant hormones. Hormonal transport. Selected topics on plant growth and development including photomorphogenesis, seed germination, domancy, and plant defense, apical dominance, fruit ripening, leaf abcission.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the study of plant physiology using mutants in Arabidopsis; - understand biotechnological opportunities by manipulating gene expression; - understand the regulation of plant growth and development by various plant hormones.		
Pre-requisites	Pass in BIOL1121 or BIOL1122 or BIOL0126		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 30 hours of laboratory/tutorials/seminars		
Assessment Method	One 2-hour written examination (75% weighting) together with assessment of practical work (25% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: In written examination: Exceptionally good organization and presentation, the discussion would be very clearly written and show evidence of originality. In practical sessions: excellent insight in to the practical aims; submit good reports. B: In written examination: coherent organization and clear presentation, the discussion would be a complete and critical response to questions. In practical sessions: full understanding of the practical aims; submit accurate reports. C: In written examination and practical sessions: Good in parts, but important points omitted. Might also have defects in presentation or be not very well written. Reasonably competent, but might show misunderstanding of the material: significant inaccuracies or errors. D: In written examination and practical sessions: Some knowledge of the material is evident, but there are serious deficiencies in understanding, organization, clarity or accuracy. Write-ups that are unduly brief would fall into this category. Fail: In written examination and practical sessions: Poor knowledge and understanding of the subject, a lack of coherent and organization, and answers are largely irrelevant.		
Textbooks	P. J. Davis: Plant Hormones: Physiology, Biochemistry and Molecular Biology (Martinus Nijhoff Publishers, 1995, 2nd ed.) W. G. Hopkins: Introduction to Plant Physiology (Wiley, 1999, 2nd ed.)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2115 Cell biology & cell technology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	120
Course Co-ordinator	Dr A S T Wong, Biological Sciences		
Course Aim	To provide a coherent understanding of the structure and function of cells, and the principles and applications of cell culture and instrumentation in biology and biotechnology.		

Course Contents	I. Cell biology Cellular membranes. Organelles. Cellular transport: ions transport and ions channels. Protein and RNA transport. Membrane potentials. Action potentials. Cell junctions. Extracellular matrix. Cell-cell interactions. Cell-matrix interactions II. Techniques in animal cell culture Mammalian cells in culture. Primary and continuous cell lines. Cell types and cell growth parameters. Media formulation, growth factors and design of serum-free media. Culture lab facilities and sterilization. Mechanism of cryopreservation. III. Techniques in plant cell culture Root and shoot cultures. Explant regeneration. Protoplasts. Secondary metabolites.
Learning Outcomes	On successful completion of this course, students should be able to: - acquire fundamental knowledge on cell biology and cell technology; - demonstrate basic laboratory techniques on cell culture; - gain insight into real-life applications in cell biology and cell technology.
Pre-requisites	Pass in BIOL1121 or BIOL1122 or BIOL0126 or BIOC1001 or BIOL1125
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 5 laboratory sessions, of which one involves the use of tissues collected from euthanatized animals.
Assessment Method	One 2-hour written examination (80% weighting) together with assessment of practical work (20% weighting)
Course Grade	A+ to F
Grade Descriptors	see below

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.

Textbooks	Alberts, B. et al.: Molecular Biology of the Cell (Garland, 2008, 5th ed.) Mather, J. P.: Introduction to Cell and Tissue Culture, Theory and Techniques (Plenum, 1998) Collins H.A. & Edwards G.S.: Plant Cell Culture (Oxford: Bios Scientific, 1998)
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2118 Conservation genetics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr M Sun, Biological Sciences		
Course Aim	The course aims to familiarize students with fundamental principles and recent advances in conservation genetics. The theories and methods will be taught with a balanced range of examples - mammals, birds, reptiles, amphibians, fish, invertebrates, as well as plants - to demonstrate how genetic data can be used to answer a range of important questions in real world conservation practice.		
Course Contents	Introduction to conservation genetics. Part I. Evolutionary Genetics of Natural Populations: - genetic diversity - characterizing genetic diversity: single loci and quantitative variation; - evolutionary impacts of natural selection, mutation, migration and their interactions in large populations; - genetic consequences of small population sizes; - maintenance of genetic diversity; - population genomics. Part II. Effects of Population Size Reduction: - loss of genetic diversity in small populations; - inbreeding; - inbreeding depression; - population fragmentation; - genetically viable populations. Part III. From Theory to Practice: - resolving taxonomic uncertainties and defining management units;		

	- genetic management of wild populations; - genetic issues in introduced and invasive species; - genetic management of captive populations; - genetic management for reintroduction; - use of molecular genetics in forensics and understanding species biology.		
Learning Outcomes	On successful completion of this course, students should be able to: - demonstrate an advanced understanding of the concepts of conservation genetics; - know the criteria for determining the conservation status of endangered, vulnerable, or threatened species; - know the methods for characterizing genetic diversity at population and species levels; - understand the relationships between genetic diversity, inbreeding, reproductive fitness, and evolutionary potential in wild populations; - understand the effects of habitat fragmentation and population size reduction on genetic diversity and the implications in managing nature reserves; - gain ability to integrate genetic information in resolving taxonomic uncertainties, in understanding species biology, in setting conservation priorities, and in developing management strategies for wild and captive populations.		
Pre-requisites	Pass in BIOL0604 or BIOL1106 or BIOL1122		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 24 hours of tutorials/project/practical, and 100 hours of reading/self-study		
Assessment Method	One 2-hour written examination (50% weighting); continuous assessment (50% weighting, including quiz, mid-term test, assignment, classroom participation, and project presentation)		
Course Grade	A+ to F		
Grade Descriptors	A: Exceptionally good performance demonstrating excellent understanding of the subject matter, extensive knowledge over a wide range of topics covered by the course, and skillful applications of concepts/theories in solving new or unfamiliar problems, showing strong abilities in critical thinking and logical reasoning, with evidence of significant insight and original thought in dealing with the critical issues in the field. B: Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject, showing evidence of attaining most of the course learning outcomes. C: Adequate performance demonstrating some understanding of the subject matter, an ability to handle relatively simple problems, but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes. D: Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expected course learning outcomes. Fail: Poor performance in all aspects of the course, showing little evidence of learning, lacking real understanding of the subject matter, demonstrating deficiencies serious enough to make it inadvisable to proceed further without additional course work.		
Textbooks	Frankham et al: Introduction to Conservation Genetics (Cambridge University Press, 2009, 2nd ed.) e-book and other websites		
Remarks	Website - to be listed The course will be offered subject to a minimum enrollment as required by SBS.		

BIOL2119 Genetics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	100
Course Co-ordinator	Dr C S C Lo, Biological Sciences		
Course Aim	This course aims to provide students with fundamental knowledge of classical, molecular and population genetics.		
Course Contents	Topics will include cellular reproduction, principles and chromosomal basis of Mendelian genetics, linkage analysis and mapping, concept and definition of the gene, molecular mechanisms of mutation, DNA repair and recombination, DNA transposition, extranuclear inheritance, developmental genetics, quantitative and population genetics. Students are strongly encouraged to take BIOL2303 Molecular Biology to get a more comprehensive coverage of topics in molecular genetics.		
Learning Outcomes	On successful completion of this course, students should be able to: - Appreciate the beauty of genetic organizations in nature - Use different genetic principles to explain hereditary traits observed in nature and laboratories - Apply qualitative and quantitative experimental methodologies for genetic analysis at individual and population levels		
Pre-requisites	Pass in BIOL1121 or BIOL1122 or BIOL1125 or BIOL0126; and Not for students who have already passed in BIOL2116 or BIOL2117 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 18 hours of laboratory/tutorial		
Assessment Method	Written examination (70%), Laboratory reports and assignments (30%)		
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. Integration of the full range of appropriate theories, principles, evidence and techniques B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. General integration of theories, principles, evidence and techniques		

	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Some partial integration of theories, principles, evidence and techniques
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited integration of theories, principles, evidence and techniques
	Fail	Demonstrate little or 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. Little or no or inapt integration of theories, principles, evidence and techniques
Textbooks	W S Klug, M R Cummings, Spencer C A, Palladino M A: Concepts of Genetics (Pearson, 2009, 9th ed.)	
References	TBC	
Remarks	This course is equivalent to BIOL2116 Genetics I or BIOL2117 Genetics II offered previously. The course will be offered subject to a minimum enrollment number.	

BIOL2203 Reproduction & reproductive biotechnology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof A O L Wong, Biological Sciences		
Course Aim	To provide a comprehensive overview on modern concepts and recent advancements in reproductive biology & biotechnology.		
Course Contents	The course will cover the basic concepts of reproduction, evolution of sex & sex chromosomes, human sexuality & sexual behavior, molecular mechanisms for sex determination, developmental aspects of gametogenesis and reproductive systems, neuroendocrinology of reproductive functions, and recent advancements in biotechnology for fertility control, assisted reproduction, stem cells & regenerative medicine, germ cell transplantation, and animal cloning & transgenesis.		
Learning Outcomes	On successful completion of this course, students should be able to: (1) have a broad understanding of reproductive biology ranging from evolution of sex & reproductive strategies to the mechanisms for sex determination & development of reproductive structures; (2) have an appreciation of the endocrine control of reproductive functions including the regulation of reproductive cycle, sexual behavior, parental care, and pregnancy & giving birth to baby; (3) have a basic understanding on the causes of human infertility and different methods available for assisted reproduction & reproductive therapeutics; (4) comprehend a wide range of modern technology for gene therapy & stem cell engineering, animal cloning & transgenesis, and recent advancement in regenerative medicine, artificial organs, and germ cell transplantation.		
Pre-requisites	E or above in AL Biol; or Pass in BIOL0126 or BIOL1107		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures, 9 hours laboratory work-contact and 4 hours site visit of fertility clinic		
Assessment Method	One 2-hour written examination (70% weighting), test & continuous assessment (15% weighting) and laboratory report (15% weighting)		
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 lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	TBC		
References	(1) C. G. Nicholas (2011) "Reproduction and Adaptation", Cambridge University Press. (2) D. K. Gardner (2011) "Human Assisted Reproductive Technology", Cambridge University Press. (3) D. T. Carrell (2010) "Reproductive Endocrinology and Infertility", NY, Springer. (4) P. J. Chedrese (2009) "Reproductive Endocrinology: A Molecular Approach", NY, Springer . (5) K. K. Schillo (2009) "The Reproductive Physiology of Mammals", NY, Delmar Cengage Learning.		
Remarks	The course will be offered subject to a minimum enrollment number		

BIOL2205 Immunology (6 credits)		**Academic Year**	**2012**

Offering Department	Biological Sciences	**Quota**	100
Course Co-ordinator	Dr B L Lim, Biological Sciences		
Course Aim	To provide a broad understanding of the animal immune system. Topics will also include the application of a variety of immunological methods to research and disease diagnosis.		
Course Contents	Immunological functions in the vertebrates and analogous activities in invertebrates. Structures and biological properties of immunoglobulins and T-cell receptors. Divergence of antibody genes. Emergence and characteristic of lymphoid tissues. Major histocompatibility complex. Complement pathways. Immunity against bacteria, viruses and parasites. AIDS, Vaccination, hypersensitivity, and autoimmunity. Immunological tests and immunochemical techniques using non mammalian and mammalian antibodies and their application to various biological problems.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the structure and function of the immune molecules which are involved in the body defense mechanisms, including antibody, T-cell receptor, cytokines, MHC and complement proteins; - describe the organization of the mammalian immune system in terms of genes, cells and tissues; - explain the underlying mechanisms associated with transplant rejection, transfusion reaction and vaccination; - explain how the immune system responds to infections by bacteria, viruses and parasites; - understand antigen-antibody interaction and the principle of immunoassays.		
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; four 4-hour laboratory sessions during Reading Week. One of the practical sessions involves the collection of lymphoid cells and tissues from euthanatized animals.		
Assessment Method	One 2-hour written examination (80% weighting), continuous assessment of practical work (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Exceptionally good performance demonstrating comprehensive understanding of the subject matter; Critical insight and analysis into the scientific literatures; Superior writing, presentation and group communication skills. B: Good performance demonstrating full understanding of the subject matter; Coherent insight and analysis into the scientific literatures; Good writing, presentation and group communication skills. C: Satisfactory performance demonstrating adequate understanding of the subject matter; Some insight into the scientific literatures; Adequate writing and communication skills. D: Limited performance demonstrating some understanding of basic subject matter; Some ability to use the scientific literatures; Limited writing and communication skills. Fail: Poor understanding of subject matter; Little to no insight into use of the scientific literatures; Unable to write or communicate.		
Textbooks	J. Kuby: Immunology (Freeman and Company, 2000, 2003 or 2007, 6th ed.) Benjamin & Leskowitz: Immunology: A Short Course (Wiley-Liss, 2007, 6th edition. Or the latest edition) I. Roitt, J. Brostoff and D. Male: Immunology (Mosby, latest 2 editions)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2207 Endocrinology: human physiology II (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	90
Course Co-ordinator	Prof B K C Chow, Biological Sciences		
Course Aim	To provide an advanced course on hormones and how they regulate metabolism/growth, reproduction and water/salt homeostasis in our body.		
Course Contents	History: discovery of blood borne factor or hormone. Chemical nature of hormones. Mechanisms of cell-cell signaling. Secondary messengers. Responsivity and hormonal effects. The hypothalamic pituitary axis The GHRH-GH-IGF axis. The TRH-TSH-thyroid hormone axis. The CRH-ACTH-cortisol axis. Cortisol and stress. Catecholamine effects and their pathways. The gastrointestinal system The enteric nervous system. The cephalic phase, stomach phase and intestinal phase of food digestion. Regulation of acid secretion. Regulation of pancreatic exocrine and endocrine secretion. Gut hormones: gastrin, GIP, CCK, secretin, GLP-1, GLP-2 and motilin. Regulation of feeding, energy balance and food intake. Insulin and glucagon. Reproduction The GnRH-gonadotropin-sex hormone axis. Regulation of LH and FSH release. Male reproductive system. Interaction of hormones produced by various cells in the testis to regulate spermatogenesis. Biological actions of testosterone. The erection reflex. Female reproductive system. Development of ovarian follicles. The menstrual cycle: hormonal control: Ovulation, fertilization and implantation. The placenta as an endocrine organ. Endocrine regulation of parturition. Hormonal control of milk secretion. Prolactin and broodiness. Osmoregulation Posterior pituitary hormone, ADH. Aldosterone and sodium balance. Angiotensin's effect on blood pressure. Atrial natriuretic peptide and its function in water and sodium balance.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the definition and natures of hormones; - Explain and describe secondary messenger pathways for hormones; - Describe the connection between pituitary the master gland with higher brain centers and peripheral organs; - Explain and describe hormones involved in the regulation of 3 most important body functions including metabolism/growth, reproduction and water/salt homeostasis.		
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126		

Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; a 3-hour laboratory session per week for 5 weeks		
Assessment Method	One 2-hours written paper (80% weighting) and continuous assessment of laboratory work (20% weighting)		
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.	
	B	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills.	
	C	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills.	
	D	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills.	
	Fail	Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective.	
Textbooks	Williams textbook of Endocrinology, (Elsevier, 11th Edition, 2009). Silverthorn: Human Physiology, An Integrated Approach (Pearson, 2006, 4'" edition).		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2210 Evolution (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr M Sun, Biological Sciences		
Course Aim	Evolution is the cornerstone of modern biology. The course aims to introduce students to the major themes of contemporary evolutionary biology, including the history of evolutionary biology, evolutionary processes, adaptation, speciation, and evolution as an explanatory framework at all levels of biological organization. The course emphasizes the interplay between theory and empirical tests of hypotheses, thus acquainting students with the process of science.		
Course Contents	Introduction to Evolution - The relevance of evolution to everyday life - Cases for evolutionary thinking Evolution as Fact - Patterns of evolutionary change - The evidence for evolution Evolution as Theory - Before Darwin - Darwinism - The Modern Synthesis & beyond The Mechanisms of Evolution - The origin of genetic variation: mutation - Genetic drift: evolution at random. - Natural selection, sexual selection, and adaptation. - Migration Evolution and Biodiversity - The history of life - Species and the mechanisms of speciation - Genomic and developmental mechanisms of evolutionary innovation		
Learning Outcomes	On successful completion of this course, students should be able to: - be familiar with the facts and theory of evolution; - be able to describe Darwin's theory of evolution by natural selection and how the process of natural selection can lead to speciation; - have an advanced understanding of the modern evolutionary theory since Darwin's days and its practical applications in agriculture, medicine, and biological conservation; - apply evolutionary thinking to tackle important issues arising from everyday lives.		
Pre-requisites	Pass in BIOL0126 or BIOL0604 or BIOL0625 or BIOL1122 or BIOL1106		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 12 hours of tutorials, 12 hours of project and 100 hours of reading/self-study		
Assessment Method	One 2-hour written examination (50% weighting); continuous assessment (50% weighting, including quiz, mid-term test, assignment, classroom participation and project presentation)		
Course Grade	A+ to F		
Grade Descriptors	A	Exceptionally good performance demonstrating excellent understanding of the subject matter, extensive knowledge over a wide range of topics covered by the course, and skillful applications of concepts/theories in solving new or unfamiliar problems, showing strong abilities in critical thinking and logical reasoning, with evidence of significant insight and original thought in dealing with the critical issues in the field.	

	B	Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject, showing evidence of attaining most of the course learning outcomes.
	C	Adequate performance demonstrating some understanding of the subject matter, an ability to handle relatively simple problems, but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.
	D	Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expected course learning outcomes.
	Fail	Poor performance in all aspects of the course, showing little evidence of learning, lacking real understanding of the subject matter, demonstrating deficiencies serious enough to make it inadvisable to proceed further without additional course work.
Textbooks	Futuyma D.J.: Evolution (Sinauer, 2009, 2nd Ed.) Barton et al: Evolution Scion Publish Ltd. 2007 S. Freeman and J.C. Herron: Evolutionary Analysis (Pearson, 2007, 4th ed.) Ridley, M.: Evolution (Blackwell Publishing, 2004, 3rd ed.) e-book and other websites	
Remarks	Website - to be listed The course will be offered subject to a minimum enrollment number as required by SBS.	

BIOL2215 Animal Physiology & Environmental Adaptation (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof A O L Wong, Biological Sciences		
Course Aim	The course covers the major aspects of animal physiology for environmental adaptation in terrestrial & aquatic habitats. Stress will be given to the functional interactions between animals and the environment, especially on the mechanisms by which animals obtain resources for survival from the environment, detect environmental changes via sensory structures, and respond to adversities in the environment by altering their body forms & functions.		
Course Contents	Basic concepts of animal adaptation to environmental changes/extreme environment; Modification of energy metabolism according to oxygen availability; Different models of gaseous exchange for aquatic, inter-tidal, and terrestrial habitats; Cross-adaptation to different environment: air-breathing fish vs diving adaptations in mammals; Visual signals & differential levels of photoreception from protozoa to mammals; Background adaptation: functions & mechanisms for color presentation; Sound wave as environmental signals: functions & mechanisms of detection in aquatic & terrestrial habitats; Echo sounding in bats for navigation without visual signals; Behavioral, morphological & physiological adaptations in hostile environment: extreme hot vs freezing cold; salinity changes in aquatic habitats & water availability in terrestrial habitats on osmoregulation, water balance & nitrogenous metabolism.		
Learning Outcomes	On successful completion of this course, students should be able to: - have a broad understanding on functional interactions between animals and their environment - appreciate the role of the environment in shaping the evolution of animal structures & functions - comprehend a wide range of physiological adaptations (both structurally & functionally) in coping with environmental stress		
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL1121 or BIOL1122 or BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures		
Assessment Method	One 2-hour written exam (75% weighting) and test & continuous assessment (25% weighting)		
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.
Textbooks	(1) E. N. Marieb (2012) Essentials of Human Anatomy & Physiology. Benjamin Cummings. (2) C. L. Stanfield (2011) Principles of Human Physiology, Benjamin Cummings. (3) R. W. Hill, G. A. Wyse & M. Anderson (2008) Animal Physiology, Sinauer Associate, Inc., Sunderland. (4) C. D. Myoyes & P. M. Schulte (2008) Principles of Animal Physiology. Benjamin Cummings.	
Remarks	The course will be offered suject to the minimum enrollment number. Please refer to the course website of School of Biological Sciences.	

BIOL2218 Human physiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	120
Course Co-ordinator	Dr W Y Lui, Biological Sciences		
Course Aim	The course covers major aspects of the physiology of the human body using an integrated approach. After completing this course, students will have acquired fundamental principles of how the body works. Students interested in nutrition and human biology will find this course most useful.		
Course Contents	Overview of the physiological systems and homeostasis; Neural and hormonal communication; Nervous system physiology; The digestive system; Cardiac physiology, the blood vessels and blood pressure; The respiratory system; The urinary system; The skeletal & muscular system; Sensory mechanisms; Biological rhythms; Central-peripheral communication in energy homeostasis.		
Learning Outcomes	On successful completion of this course, students should be able to: - Comprehend the essence of how the body meets changing conditions while maintaining a relatively constant internal environment - Understand the functions of various body systems - Explain normal body functions through integration of basic physiologic concepts		
Pre-requisites	Pass in BIOL1122 or BIOL0126		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours lectures		
Assessment Method	One 2.5-hour written exam (70% weighting) and continuous assessment (30% weighting)		
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. B: Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. C: Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. D: Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills. Fail: Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective.		
Textbooks	Silverthorn D. U.: Human Physiology: An integrated Approach (Pearson, 2008) Sherwood L.: Human Physiology: From Cells to Systems (Thomson, 2007) Fox S.I. Human Physiology (McGraw Hill, 2009) Johnson M. D.: Human Biology (Pearson, 2006) Siegel G. J. et al.: Basic Neurochemistry (Academic Press, 2006) Mulroney S.E. & Myers A.K. Netter's Essential Physiology (Saunders, 2009)		
References	TBC		
Remarks	The course will be offered subjected to a minimum enrollment number.		

BIOL2301 Protein structure and function (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	150
Course Co-ordinator	Dr W K Yip, Biological Sciences		
Course Aim	To provide students with a good understanding of protein structure, how structure subserves function, and the methods for study of both. This course provides a strong foundation for advanced courses in biochemistry and biotechnology.		
Course Contents	The course will include: Elements of structure: sequencing, prediction and determination of secondary and higher structures; Methods for determination of structure: X-ray crystallography, various optical methods, ultracentrifugation and several hydrodynamic methods for determination of molecular size and shape; Structure and function: molecular motifs, recognition and binding, evolution, natural and artificial mutants; Enzymology: kinetics and energetics of binding, transition state and molecular mechanisms of catalysis; Protein purification and characterization: various liquid chromatographical methods, methods of determinations of molecular masses and weights; Applications: drug design and antibody design, protein stability.		
Learning Outcomes	On successful completion of this course, students should be able to: - design assaying methods for enzymes - find out kinetic parameters of proteins or enzymes by graphically techniques - learn about the ways to purify protein and the many industrial uses of proteins		
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL1122 or BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 12 hours of tutorials (to be arranged)		

Assessment Method	One 2.5-hour written examination (70% weighting) and continuous assessment (30% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Exceptionally good performance demonstrating comprehensive understanding of the subject matter; Critical insight into the scientific literature; Superior writing and group communication skills. B: Good performance demonstrating full understanding of the subject matter; Coherent insight into the scientific literature; Good writing and group collaboration skills. C: Satisfactory performance demonstrating adequate understanding of the subject matter; Some insight into the scientific literature; Adequate writing and group collaboration skills. D: Limited performance demonstrating some understanding of basic subject matter; Some ability to use the scientific literature; Limited writing and group collaboration skills. Fail: Poor understanding of subject matter; Little to no insight into use of the scientific literature; Unable to write or collaborate.
Textbooks	None prescribed
References	To be announced.
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2302 Fermentation technology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	TBC, Biological Sciences		
Course Aim	To introduce the key concepts and principles involved in fermentation technology, and discuss how fermentation technology is used in the food and biotechnology industries.		
Course Contents	Microorganisms involved in fermentation, fermentation kinetics and modelling, culture isolation, screening and maintenance, biosynthesis of primary and secondary metabolites, substrate utilization, inhibitory substrates, medium preparation, product recovery and purification, modes of cultivation. Application of these principles to various fermentation processes such as beer, soy sauce, lactic acid, yoghurt, cheese, alcohol, fermented meat and vegetables, single cell protein, pharmaceuticals, pigments, etc.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand diversity of microorganisms used in fermentation - understand how to isolate, screen and maintain cultures - understand basic calculation using mass balance and stoichiometry - understand fermentation kinetics and mathematical modelling - understand various modes of cultivation		
Pre-requisites	Pass in BIOL1122 or BIOL0126 or BIOL1123 or BIOL1528 or BIOL0129 or BIOL0135		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	24 lectures; 24 hours of laboratory/tutorials/seminars/field-trip		
Assessment Method	One 2-hour written paper (75% weighting); continuous assessment of laboratory work, project and assignments (25% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: B: C: D: Fail:		
Textbooks	TBC		
References	H. W. Doelle: Microbial Process Development (World Scientific, 1994) P. F. Stanbury et al.: Principles of Fermentation Technology (Pergamon, 1995) C. Ratledge and B. Kristiansen: Basic Biotechnolgoy (Cambridge, 2001) K. Shetty et al.: Food Biotechnology (Taylor & Francis, 2006, 2nd edition)		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2303 Molecular biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Prof B K C Chow, Biological Sciences		
Course Aim	To provide students with recent knowledge in molecular biology with special emphasis on the study of gene structure and function at the molecular level.		
Course Contents	The course includes a detailed account of the molecular processes in eukaryotic and prokaryotic cells, from DNA replication, RNA transcription, protein translation, to post-translational modifications with special emphasis on the regulation of prokaryotic and eukaryotic gene expression. Recently developed biochemical techniques including oligonucleotide synthesis, DNA sequencing, complementary screening and DNA cloning, site-directed mutagenesis, polymerase chain reaction and transgenic technology will also be discussed.		
Learning Outcomes	On successful completion of this course, students should be able to:		

	- Know the basic structures of DNA, RNA and protein, and how DNA is package in the nucleus of eukaryotic cells. - Understand the biochemical processes involved in DNA replication, transcription, translation and post-translational modifications in prokaryotes and eukaryotes. - Explain and describe the regulation of gene transcription in prokaryotes and eukaryotes. - Demonstrate knowledge and understanding of the underlying concepts associated with recently developed techniques including PCR, site-directed mutagenesis, DNA sequencing.
Pre-requisites	Pass in BIOL1121 or BIOL1122 or BIOL0126 or BIOL0129 or BIOL0135 or BIOL1125
Offer in 2012 - 2013	1st sem 2nd sem — **Examination**: Dec May
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures, 5 x 4-hours laboratory sessions
Assessment Method	One 2-hour written examination (70% weighting), mid-term quiz and assessment of practical work (30% weighting)
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 lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. **B**: Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. **C**: Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. **D**: Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. **Fail**: Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Textbooks	R. Weaver: Molecular Biology (McGraw-Hill, 2005 or 2008) J. Watson et al.: Molecular Biology of the Gene (Benjamin Cummings, 2004) B. Lewin: Gene IX (Jones and Bertlett, 2008) Selected journal articles and web learning materials.
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2318 Biological sciences field course (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	20
Course Co-ordinator	Dr L Karczmarksi, Biological Sciences		
Course Aim	This course is offered as an experiential learning experience and will require intense study of a topic during a field course, inside or outside Hong Kong.		
Course Contents	Every year a number of different potential courses may be offered. The precise contents will be tailored to best suit the topic and locality involved and will therefore vary according to the specific course being held. The basic contents will involve lectures, seminars and extensive field and follow-up laboratory work. It is essential that students contact the course coordinator for further information on the courses available.		
Learning Outcomes	On successful completion of this course, students should be able to: - Have an understanding of the biodiversity and primary habitats in the ecosystem studied. - Have established the basic skills needed to identify target species associated with the field course. - Be knowledgeable about and able to implement sampling techniques for organisms in the particular ecosystems studied. - Understand the basic ecology of target species and how biotic and abiotic factors shape focal communities. - Be aware of the relationships between humans and the species and habitats of interest.		
Pre-requisites	Students are expected to have successfully completed their first year. The pre-requisites will vary according to the specific course.		
Offer in 2012 - 2013	Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	60 hours of formal and student centered learning. Residential field trip during a reading week or in the summer or winter breaks. Note students will have to pay for their own travel and accommodation costs (prices to be announced).		
Assessment Method	Continuous Assessment, exams and small project work (100%)		
Course Grade	A+ to F		
Grade Descriptors	**A**: Evidence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excellent familiarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical skills. Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader comparative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.		

	B	Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.
	C	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logical critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.
	D	Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.
	Fail	No evidence of basic a minimum grasp of the subject and the minimum relevant research techniques. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.
Textbooks	Students will be directed to relevant scientific literature and websites.	
References	TBC	
Remarks	Subclass A: Marine Mammal Field Course (Course Coordinator: Dr L Karczmarski) Subclass B: Marine Life Science: a North East Pacific perspective (Course Coordinator - Dr V Thiyagarajan) Subclass C: Sustainable Food Production (Course Coordinator - Dr H S El-Nezami) Sublcalss D: Animal Behaviour Field Course (Course Coordinator - Dr L Karcsmarski) http://www.biosch.hku.hk/ecology/lsc/biol2318/ Students are expected to have successfully completed their first year. The pre-requisites will vary according to the specific course. Please contact the course coordinator for details. The course will be offered subject to a minimum enrollment number.	

BIOL2320 Directed studies in biological sciences (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr M Sun, Biological Sciences		
Course Aim	Students will undertake a dissertation on an agreed topic or carry out a small scale project in biological sciences. The student will develop scientific writing and presentation skills.		
Course Contents	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic. The student should obtain the commitment of a supervisor, decide on a title of the dissertation or project, and then seek approval from the course coordinator. Supervisors will introduce various techniques and guide students to complete their dissertation or project. Teaching will be informal and students will gain knowledge through discussion and feedback from the supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - Be acquainted with the process of science, and develop the key intellectual skills that will be valuable for all scientific studies - Be able to apply scientific methods to address important issues in various biological disciplines - Have a better understanding of the nature of biological sciences		
Pre-requisites	Pass in at least 18 credits of any BIOLXXXX courses; and Cumulative GPA of 2.7 or above		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Regular meetings between the supervisor and student. Guidance from the supervisor on the scientific methods, and on how to think and write scientifically. Students should spend at least 50 hours on the dissertation or project. Recommended reading may be assigned.		
Assessment Method	A dissertation or project report of approximately 6,000 - 8,000 words must be submitted (80% weighting); a 20-minute oral presentation/examination will also be required (20% weighting).		
Course Grade	A+ to F		

Grade Descriptors		
	A	Work displaying a high level of scholarship and originality; virtually flawless presentation with excellent introduction to dissertation topic, showing a thorough grasp of the topic from background reading and analysis; clear statement of the objectives of the research; comprehensive exploration of the topic, personal synthesis of the issues with detailed support from the literature; comprehensive and up-to-date references integrated into argument or logical reasoning; critical evaluations of the main points or problems and their solutions and implications; thought-provoking discussions; accurate summary. All chapters/paragraphs are well-connected and presented logically with clarity of goals, demonstrating excellent organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. All other aspects of the dissertation conform to a high academic standard.
	B	Work showing some evidence of originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; demonstrating substantial understanding of fundamental concepts of the field of study; adequate grasp of the topic from background reading and analysis; a systematic exploration of the topic which may include an attempt at critical comment or appraisal; regular support provided from the literature; comprehensive and up-to-date references included; main points fully elaborated; summary given in the final chapter/paragraphs; communicating information and ideas clearly and fluently, demonstrating good organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. Most aspects conform to a high academic standard.
	C	Work showing no evidence of originality and insight, but the presentation demonstrated adequate understanding and comprehension of most aspects of the dissertation topic; essential topic materials have been read and acknowledged; the main points presented in logically sequential paragraphs; reasonably balanced discussion of the major issues; acceptable interpretation of the topic, some explanation, illustration and support provided from the literature; summary given in the final chapter/paragraphs; most presentation details met (front page, margin, legibility, citations correctly reported and tabulated, etc.); few typos or grammatical errors; Most aspects conform to an acceptable academic standard.
	D	Demonstrating superficial or partial or faulty understanding of the fundamental concepts of the field of study; showing the bare minimum of information, poorly digested and not very well organized in presentation; irrelevant material; showing no evidence of critical thinking; arguments undeveloped or inappropriate or unsupported; lack of clarity or structure in communicating information or ideas. dissertation topic not fully covered; discussion too brief or just repeating the data or findings; overuse

		quotations with little explanation; insufficient support from literature; reading not well incorporated into the text; limited acknowledgements and light bibliography; some major points missed. Minimum conform to an acceptable academic standard.
	Fail	The dissertation topic was not covered acceptably; demonstrating evidence of poor knowledge, clear deficiencies in understanding fundamental concepts; materials largely irrelevant; incomplete or confusing communication of information or ideas; unreflective; incoherent argument; complete misinterpretation of the topic or data; no evidence of reading (no acknowledgements or bibliography); structure confused or not discernible; Fail to meet most or all of the basic requirements of the course. The written work is not of an academic standard.

BIOL2324 Microbial physiology and biochemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr A X Yan, Biological Sciences		
Course Aim	Microbial physiology and biochemistry serves as a basis for many of the sub-disciplines of microbiology, including mycology, virology, immunology, and medical, food and industrial microbiology. This course is designed for students to obtain a profound understanding on the constituents, metabolisms, and functions of microbial cells. After completing this course, students will have acquired fundamental principles of microbial physiology and biochemistry, and be able to relate these knowledge to various applications of microorganisms.		
Course Contents	Introduction to Microbial Physiology and Biochemistry; Structure and function of the prokaryotic cells; Microbial growth and control; Energy generation; Central metabolism; Regulation and control of metabolic activities.		
Learning Outcomes	On successful completion of this course, students should be able to: - Appreciate the diversity of microbial metabolisms and the strategies for their adaptive responses. - Comprehend the principles underlying the dynamic nature of microbial physiology. - Relate knowledge to practical application of microbes in industry and medicine. - Develop abilities to read and assess scientific literatures in microbiology area.		
Pre-requisites	Pass in BIOL0129 or BIOL0135 or BIOL0120 or BIOL1120; and Pass in BIOL2111 or BIOL2303, or already enrolled in either course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours lectures including in-class tutorials		
Assessment Method	One 2-hour written examination (50% weighting) and continuous assessments (50% weighting)		
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.	
	B	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills.	
	C	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills.	
	D	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills.	
	Fail	Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective.	
Textbooks	Prescott's Principles of Microbiology, by Joanne M. Willey, Linda M. Sherwood, and Christopher J. Woolverton, published by McGraw-Hill On-line textbook of Bacteriology: Kenneth Tobar, U. of Wisconsin-Madison, Department of Bacteriology. URL (http://www.textbookofbacteriology.net/)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2503 Grain production & utilization (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr H Corke, Biological Sciences		
Course Aim	To provide a broad understanding of the utilization and significance of the major grains in the food industry and in human health and nutrition.		
Course Contents	- Global grain production and consumption - The Green Revolution and its aftermath - International grain trade - Wheat: flour milling, dough rheology, the baking process, baking quality - Wheat: quality of Asian products including steamed bread and noodles - Wheat: small-scale tests for quality - Rice: nutritional quality, consumer preferences, milling, quality, quality testing, products - Maize: products of wet milling, animal feed development - Biofuels focusing on bioethanol - Illustrative business case studies on the grain processing industry will be discussed		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the major production, import, and export patterns that support the global utilization of grain		

	- Understand the technology behind the production of grain-based foods - Understand the scope and nature of professional level quality testing for grain products - Appreciate the constraints to global food sufficiency - Appreciate the ethical issues behind the diversion of grain into meat and biofuel production
Pre-requisites	Pass in BIOL0002 or BIOL1122 or BIOL1528
Offer in 2012 - 2013	1st sem **Examination** Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 30 hours practicals laboratory and 6 hours seminars/presentations
Assessment Method	One 2-hour written examination (70% weighting) and project and presentation (30% weighting)
Course Grade	A+ to F
Grade Descriptors	**A**: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. **B**: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. **C**: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. **D**: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. **Fail**: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.
Textbooks	"Encyclopedia of Grain Science', edited by Wrigley CW, Corke H, and Walker CE (2004) 3 Volumes, 1,700 pages. Elsevier, Oxford. (selected chapters only)
References	TBC
Remarks	The course will be offered subjected to a minimum enrollment number.

BIOL2507 Meat and dairy science (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof N P Shah, Biological Sciences		
Course Aim	To give students a broad understanding of modern practice and technologies used in meat and dairy production, processing and marketing.		
Course Contents	Principles of animal nutrition and feed formulation; genetic selection and breeding of farm animals; slaughter and carcass inspection; meat preservation and safety; sensory quality of meat. Dairy processing emphasizing fermented products such as cheese and yogurt; probiotics and health effects. Meat and dairy product marketing.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand modern practices in meat and dairy production; - Demonstrate a knowledge and understanding of meat and dairy sensory quality, and the technologies used in processing, preservation or improvement of meat and dairy products; - Demonstrate knowledge of selected issues related to meat and dairy safety.		
Pre-requisites	Pass in BIOL0002 or BIOL1122 or BIOL0126 or BIOL1123 or BIOL1528		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 24 hours of laboratory/tutorials		
Assessment Method	One 2-hour written examination (80% weighting); continuous assessment of practical work (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	**A**: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. **B**: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. **C**: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. **D**: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis		

	Fail	of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.
Textbooks	Lawrie's Meat Science. RA Lawrie (CRC Press, 2006) Dairy Processing and Quality Assurance. RC Chandan, A Kilara, N Shah (Eds) (Blackwell, 2008)	
References	TBC	
Remarks	The course will be offered subjected to a minimum enrollment number.	

BIOL2515 Food microbiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	75
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences		
Course Aim	This course provides the key concepts and principles of food microbiology with special emphasis on the interaction between microorganisms and food., microbial food spoilage and foodborne diseases will be discussed in detail.		
Course Contents	Detection and enumeration of microbes in foods, Factors that influence microbes in foods, Spores and their significance, Physical methods of food preservation, Chemical preservation and natural antimicrobials, Foodborne pathogens.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe methods for evaluating microorganisms and their products in foods. - Demonstrate an understanding of the causes of food spoilage, and predict response of a microorganism that can spoil a given food. - Develop and implement appropriate measures to control the spoilage and pathogenic microorganisms in a food. - Demonstrate the ability to work in a team to investigate and solve problems in food microbiology		
Pre-requisites	Pass in BIOL0002 or BIOL1123 or BIOL1528 or BIOL0129 or BIOL0135		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures; 12 hours tutor; 24 hours laboratory and 40 hours reading/self-study		
Assessment Method	One 2-hour written examination (40% weighting); seminars and continuous assessment (40% weighting) and laboratory report (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.	
	B	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.	
	C	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.	
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.	
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.	
Textbooks	1. Food Microbiology: An Introduction, 2005, Thomas J. Montville and Karl Matthews, American Society for Microbiology (ASM) Press, Washington, DC 2. Food Microbiology: Fundamentals and Frontiers, 2007, Edited by Michael P. Doyle, Larry R. Beuchat, and Thomas J. Montville, 3rd edition, American Society for Microbiology (ASM) Press, Washington, DC		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2530 Molecular biology and nutrigenomics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr K C Tan-Un, Biological Sciences		
Course Aim	Recent advances in the understanding of the human genome have resulted in the emergence of a new science called Nutrigenomics. This course aims to provide students with an understanding of the biochemical mechanisms underpinning the science of nutrition and the relation between genes and diet-related diseases. It explains the role of nutrition at the molecular level and the concepts of nutrigenomics and		

	nutrigenetics.
Course Contents	Concepts of nutrigenomics, nutrigenetics, metabolomics and nutritional biochemistry. Regulation of gene expression; Single Nucleotide Polymorphisms and relation to diseases. Overview of lipid metabolism; cholesterol metabolic pathway; hyperlipidaemia, LDL receptor mutations. Relevance of folate, vitamin B12; hyperhomocysteinemia and gene polymorphisms in diseases. Epigenetics, Barker s hypothesis, influence of maternal nutrition in fetal gene expression. Obesity, genetic predisposition, candidate genes like leptin, FTO and other hormones involved in the control of appetite Polyunsaturated fatty acid and their roles in the control of gene expression example lipogenesis and lipid oxidation pathways; Inborn errors of metabolism in the context of genetic mutations and personalized diet therapy
Learning Outcomes	On successful completion of this course, students should be able to: 1. explain the principles of the control of gene expression 2. demonstrate understanding of the role of metabolic pathways in relationship to diet, gene expression and disease 3. discuss how genetic variations are used to study the role of genes in nutrient-related cellular processes 4. explain the relationship between genotype, epigenetics and diet-related diseases; 5. critically evaluate current theories of personalized nutrition based on individual genetic variation.
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL1106
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 hours of lectures and 12 hours of student-centered learning
Assessment Method	One 2-hour written examination (60% weighting), a mid-term test (20% weighting) and coursework (20% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show extensive ability of knowledge integration and problem solving skills. Show excellent ability to critically analyze and interpret complex scientific data and draw appropriate conclusions. Demonstrate highly effective organization and writing skills. B: Demonstrate substantial grasp of the subject matter covered. Show substantial ability of knowledge integration and problem solving skills. Show substantial ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective organization and writing skills. C: Demonstrate general and acceptable grasp of the subject matter covered. Show acceptable ability of knowledge integration and problem solving skills. Show moderate ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate moderate organization and writing skills. D: Demonstrate marginal grasp of the subject matter covered. Show limited ability on knowledge integration and problem solving skills. Show limited ability to analyse and interpret scientific data. Demonstrate basic organization and writing skills. Fail: Demonstrate little or no grasp, with little retention of information of the subject matter covered. Show lack of coherent and logical thinking, and minimal evidence in problem solving. Fail to integrate information and identify problems. Show little or minimal ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization and writing skills.
Textbooks	Lehninger Principles of Biochemistry Ordovas: Nutrigenetics and Nutrigenomics. Wiley. 2004 Brigelius-Flohe, Joost: Nutritional Genomics. Wiley. 2006. Rimbach, Fuchs, Packer: Nutrigenomics, CRC Press. 2005 Journals in Nutrition, Molecular Biology and Genetics
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2532 Diet and disease (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	75
Course Co-ordinator	Dr J M F Wan, Biological Sciences		
Course Aim	This course aims to provide understanding and insight into diseases associated with diet and basic dietetics, specifically to: 1. Explain the relationships between diet and disease. 2. Describe the role of diet in the development and prevention of common chronic diseases such as diabetes, obesity and anorexia, cardiovascular disease, cancer, immune deficiency and renal failure. 3. Differentiate risk factors that influence dietary choice. 4. Describe the rationales for postoperative nutritional support for hospitalized patients.		
Course Contents	The basics of nutrition for health and fitness and medical nutrition therapy. The role of diet in the development and prevention of chronic diseases such as cancer, diabetes, obesity and anorexia as well as bulimia nervosa, cardiovascular diseases, renal failure, etc. Malnutrition. Nutrition and immune function. Medical nutrition therapy for food allergy and food intolerance. Nutrition in pregnancy and lactation.		

Learning Outcomes	Upon successful completion of this course, students should be able to: 1. Discuss the different relationships between diet and disease. 2. Describe the role of diet in the development and prevention of diabetes, obesity and anorexia, cardiovascular disease, cancer, immune deficiency, and renal failure. 3. Clearly differentiate and interpret risk factors that influence dietary choice. 4. Describe the rationales for postoperative nutritional support for hospitalized patients.		
Pre-requisites	Pass in BIOL1514		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures, 24 hours laboratory sessions, 12 tutorials, 40 hours Reading/Self-study		
Assessment Method	One 2-hour written examination (60% weighting), test (20% weighting) and oral presentation (20% weighting)		
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. Thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective laboratory/fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective laboratory /fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective laboratory / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp of the subject, retention of some relevant information of the subject. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab / fieldwork skills and 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. 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. Apply minimally effective or ineffective laboratory / 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.

Textbooks	Selected readings will also be available on the class website. S. Rodwell Williams: Nutrition and Diet Therapy (7th ed.) Suitor & Hunter: Nutrition: Principles and Application in Health Promotion Wardlaw Gordon: Perspectives in Nutrition (2nd ed.)
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2533 Nutrition and life cycle (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr E T S Li, Biological Sciences		
Course Aim	Nutritional needs vary throughout different stages of the life cycle. This course aims to cover the functional roles of essential nutrients and highlight the nutritional concerns during specific times of growth, development, and aging.		
Course Contents	Teaching and learning will take place through an evidence-based approach and will be organized around key issues: vitamin and mineral needs and their metabolism; physiological and psychological determinants that influence nutrient requirements at different stages of the human life cycle; socio-economic factors that influence dietary habit and nutritional status.		
Learning Outcomes	On successful completion of this course, students should be able to: - have fundamental knowledge of essential micronutrient metabolism - be able to critically assess and identify the specific needs at different stages of the life cycle - relate the concept of requirement to physiological needs - understand the impact of socio-cultural factors on nutritional status		
Pre-requisites	Pass in BIOL1514		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures and 12 hours of student-centered learning		
Assessment Method	One 2 hour written examination (70% weighting) and coursework (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

	A	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability on knowledge integration, problem identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective team-based organization and presentation skills.
	B	Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective team-based organization and presentation skills.
	C	Demonstrate general but incomplete grasp of the subject matter covered. Might show misunderstanding of the materials. Show some ability on knowledge integration, problem identification and solving. Show some ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate adequately effective team-based organization and presentation skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate team-based organization and presentation skills of limited effectiveness.
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriously deficient in ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization and presentation skills.
Textbooks	Brown J.E. Nutrition Through the Life Cycle. Thomson, 2011 Edelstein S. & Sharlin J. Life Cycle Nutrition: An Evidence-based Approach. Jones & Bartlett Publishers, 2009 Gropper S.S., Smith J.L.. & Groff J.L. Advanced Nutrition and Human Metabolism (Wadsworth, 2009) L. Kathleen Mahan & Sylvia Escott-Stump: Krause's Food, Nutrition, & Diet Therapy (Saunders 2004, 11th edition)	
References	TBC	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2534 Nutrition and public health (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	110
Course Co-ordinator	Dr J M F Wan, Biological Sciences		
Course Aim	Public health nutrition unites social sciences and biomedical sciences in preventing disease and improving human health through programs aimed at enhancing good nutritional practices. This course presents a broad overview of the professional practice and essential skills required of a public health nutritionist.		
Course Contents	Public health nutrition : overview, nature and identification of problems, objectives of intervention programs. The epidemiological study of diet : disease associations. Development of dietary guidelines. Undernutrition and overnutrition : definitions, prevalence, public health consequences, and interventions. Epidemiology, public health consequences, and elimination of vitamin and mineral deficiencies. Disease prevention. Educating the public for healthy eating and food safety.		
Learning Outcomes	On successful completion of this course, students should be able to: - have a broad knowledge of the scope and methodologies of public health nutrition - have a clear technical understanding of a range of selected examples of public health nutrition cases in less-developed and developed countries - be able to formulate recommendations for action for nutritional interventions at the community level - understand the impact of socio-cultural factors on community food choices and consequently on health outcomes		
Pre-requisites	Pass in BIOL1514		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures, 16 hours practicals, and 8 hours tutorials/presentation		
Assessment Method	One 2-hour written examination (70% weighting) and coursework (30% weighting)		
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. Thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective laboratory/fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective laboratory /fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective laboratory / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp of the subject, retention of some relevant information of the subject. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab / fieldwork skills and 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. 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. Apply minimally effective or ineffective laboratory / 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.		

Textbooks	Public Health Nutrition (The Nutrition Society Textbook Series, 2004) MJ Gibney, BM Margetts, JM Kearney, L Arab (Eds)
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2535 Food processing and engineering laboratory course (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	70
Course Co-ordinator	Dr J C Y Lee, Biological Sciences		
Course Aim	To provide students with basic principles and methodologies of food processing and preservation technology. To cover key engineering principles relevant to the food industry. Students will gain hands-on experience with selected food processing and preservation techniques.		
Course Contents	Food processing is a multidisciplinary field combining applied physical sciences with knowledge of product properties and requirements. This course introduces the technical knowledge required to implement cost-effective production and commercialization of food products and services. The design and development of processes, equipment and machinery used to convert raw agricultural materials and ingredients into safe, convenient, and nutritious consumer food products are covered. We discuss the basic engineering principles and applications of methods in food processing and preservation. Techniques discussed will include those for high and low temperature processing, concentration, dehydration, baking and extrusion.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand basic principles of food processing methods and preservation technology. - Be able to apply their knowledge and practical skills to process and develop food products. - Demonstrate in-depth understanding of selected methods and problems in food processing and preservation.		
Pre-requisites	Pass in BIOL0002 or (BIOL1123 and BIOL1513) or BIOL1528		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 24 hours of laboratory/ tutorial/ field trip/ seminar		
Assessment Method	One 2-hour written examination (70%); continuous assessment of practical work (20%) and assignment (10%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong evidence of analytical and critical abilities of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses advanced techniques and equipment for a variety of food-specific purposes. Demonstrates advance skills in designing, producing and evaluating solutions of excellent quality for specific food purposes. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses techniques and equipment for a variety of food-specific purposes. Demonstrates high-level skills in designing, producing and evaluating solutions of high quality for specific food purposes. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions. C: Demonstrate general but incomplete grasp of the subject matter covered. Show adequate evidence of analytical and critical abilities and logical thinking of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses appropriate techniques and equipment for a variety of food-specific purposes. Demonstrates adequate skills in designing, producing and evaluating solutions of sound quality for specific food purposes. Use lab skills and techniques and analysis of data and results to draw moderately appropriate conclusions. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking of the changes that take place in variety of food during preparation, processing and storage. Identifies and uses basic techniques and equipment for a variety of food-specific purposes. Demonstrates basic skills in designing, producing and evaluating solutions for specific food purposes. Use lab skills and techniques and analysis of data and results to draw appropriate conclusions occasionally. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking of he changes that take place in variety of food during preparation, processing and storage. Identifies with guidance factors and uses some appropriate techniques and equipment for a limited range of food-specific purposes. With guidance, demonstrates limited skills in designing, producing and evaluating solutions for specific food purposes. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions.		
Textbooks	Food Processing Technology-Principles & Practice 3rd Ed P.J. Fellows Unit Operations in Food Processing - 2nd ed. R.L. Earle		
References	TBC		
Remarks	The course will be offered sujbject to a minimum enrollment number.		

BIOL2536 Food and nutrients analysis laboratory course (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	70
Course Co-ordinator	Dr M F Wang, Biological Sciences		
Course Aim	To introduce basic principles and provide practical training in food and nutrient analysis. To help students to understand the principles behind analytical instruments used in food analysis. To train students to analyze major and minor food components as well as some food adulterants.		
Course Contents	The key concepts in professional food analysis in an industry context will be introduced. Basic analytical techniques for macronutrients (e.g. protein, carbohydrate and fats), micronutrients (vitamins and minerals) and adulterants in food will be covered. A variety of classical and instrumental techniques used in		

	food analysis will be discussed: rheology and texture measurement, thermal analysis, color, spectroscopy, chromatography and electrophoresis.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the basic principles of food and nutrient analysis; - be familiar with a variety of classical and instrumental analytical techniques; - understand the principles behind analytical instruments associated with food; - be able apply their knowledge and laboratory skills in novel situations to measure and analyze the macronutrient and micronutrient of food products; - be able to select and justify an appropriate analytical technique to solve practical food analysis problems.		
Pre-requisites	Pass in BIOC1001 or BIOL1125 or BIOL0128 or BIOL1122 or BIOL0126 or (BIOL1123 and BIOL1513) or BIOL1528		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 24 hours of laboratory sessions		
Assessment Method	One 2-hour written examination (60%); continuous assessment of practical work and assignment (40%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.		
Textbooks	Y. Pomeranz and C.E. Meloan: Food Analysis: Theory and Practice (Van Nostrand Reinhold, 1994, 3rd ed.) S. S. Nielsen: Introduction to the Chemical Analysis of Foods (Jones & Barlett, 2000, 2nd ed.)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2538 Nutraceuticals and functional foods (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr M F Wang, Biological Sciences		
Course Aim	To provide a fundamental understanding of the rapidly emerging functional food/nutraceutical industry with an emphasis on the history, regulation, chemical basis and quality control of healthy ingredients/products and their effects on human health.		
Course Contents	Concept, history and global regulation of functional foods and nutraceuticals; classification of functional foods and nutraceuticals based on their chemical structures; unsaturated fatty acids, proteins, food pigments and dietary fibers as healthy food ingredients; health benefits of dietary phenolics, terpenes, phytosterols and sulphur-containing compounds; probiotics and prebiotics; small berries, spices, teas and herbs for health; quality control and assurance of functional foods and nutraceuticals.		
Learning Outcomes	On successful completion of this course, students should be able to: -understand the definition and global regulation of functional foods and nutraceuticals -have substantial chemical knowledge of functional food and nutraceutical products - be able to describe examples of functional foods and interpret critically their claimed health benefits -demonstrate understanding of the current functional food and nutraceutical industry -understand major techniques and technologies for quality control and manufacturing of healthy products		
Pre-requisites	Pass in BIOL1514 and BIOL1528		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures and 12 hours tutorials/seminars		
Assessment Method	One 2-hour written examination (70% weighting) and continuous assessment (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use knowledge to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.		

	B	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use knowledge to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.
	C	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use knowledge to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use knowledge to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use knowledge ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.
Textbooks	R. E. C. Wildman: Handbook of Nutraceuticals and Functional Foods (CRC Press, 2007) C. M. Hasler: Regulation of Functional Foods and Nutraceuticals: a Global Perspective (IFT Press, 2005)	
References	TBC	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2540 Food and Nutritional Toxicology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	90
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences		
Course Aim	This course will provide students basic principles of toxicology with primary emphasis on entry and route of exposure of toxicants, absorption, metabolism, distribution and excretion of food toxins, local and systemic effects of toxins, the importance of dose-response in toxicology.		
Course Contents	Topics include a discussion on exposure and entry routes, fates of toxic substances in the body (toxicokinetics), concepts in experimental toxicology, the dose response relationship, actions of toxic substances, target organ effects, the actions and types of carcinogens, and a survey of the health effects of common classes of toxic substances is also presented.		
Learning Outcomes	On successful completion of this course, students should be able to: 1. Demonstrate an understanding of the processes involved in absorption, distribution, metabolism and excretion of toxicants, including an understanding of the toxicokinetic behavior of toxicants in mammals. 2. Demonstrate an understanding of the various effects induced after exposure to toxicants. 2. Demonstrate an understanding of the factors which underlie species differences in response to potential toxicants. 4. Demonstrate the ability to work in a team to address tasks relevant to toxicants of importance to human health.		
Pre-requisites	Pass in BIOL1528 or BIOL1123		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 16 hours laboratory, 8 hours tutorial		
Assessment Method	One 2-hour written examination (50% weighting); continuous assessment of laboratory work and group seminar (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.		
Textbooks	S. S. Deshpande: Handbook of Food Toxicology (Marcel Dekker Inc., NY, 2002)		
Remarks	This course is to replace BIOL2529 Food and Nutritional Toxicology The course will be offered subject to a minimum enrollment number.		

BIOL2606 Environmental microbiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80

Course Co-ordinator	Dr J D Gu, Biological Sciences		
Course Aim	To familarize students with the role of various microorganisms in natural process which affect our environment, such as recycling of chemical elements, interactions with plants and animals, and the way in which they carry out biodegradation of environmentally important pollutants. Selective groups of microorganism will be examined in detail for their biochemical processes. Key concepts are illustrated with known examples and cases.		
Course Contents	1. Advanced aspects of microbial diversity, ecology and growth. 2. Contribution of microbial metabolism to biogeochemical processes important in cycling of nutrients. 3. Microbial interactions with plants and animals. 4. Microbial metabolism of organic compounds, metals and man-made polymers. 5. Training in laboratory and field microbiological research techniques.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand a range of microorganisms in the environment in terms of their roles and function as well as biochemical capability and host range. - Know the specific biochemical processes, enzymes involved and reactions carried by selective microorganisms and their distribution in the environment. - Apply the appropriate techniques in environmental and microbial research.		
Pre-requisites	Pass in BIOL0129 or BIOL0135 or ENVS1002 or BIOL0126		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 36 hours of laboratory classes/student-centred learning		
Assessment Method	One 2-hour MCQ and written answer examination (60% weighting), coursework (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	M.T. Madigan, J. M. Martinko, P.V. Dunlap and D.P. Clark: Brock Biology of Microorganisms (Pearson/Benjamin Cummings, 2009, 12th ed.) R.M. Atlas and R. Bartha: Microbial Ecology: Fundamentals and Applications (Benjamin Cummings, 1998, 4th ed.)		
References	Molecular Biology of the Cell - Fifth Edition by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter (December 2007) R. Mitchell and J.-D. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2606/		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2607 Fish biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof Y J Sadovy, Biological Sciences		
Course Aim	To acquaint students with the principles governing interrelationships among fishes as well as with the biotic and abiotic aspects of their environment thereby to provide an understanding of the factors determining species population dynamics and multispecies interactions. To understand species diversity in relation to conservation and management challenges in different assemblages with emphasis on coral reef assemblages, and an introduction to local reef fishes.		
Course Contents	Introduction to course: biological and ecological concepts; fish diversity and morphological adaptations. Single species patterns: influence of environment on distribution; feeding ecology; growth; movement; reproduction and modes of sexuality; strategies in time and space. Multispecies interactions: competition and mutualism; marine and freshwater fish assemblages; coral reef communities; censusing fish communities. Conclusion: biodiversity; conservation of fishes; ethics of fish research and exploitation.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand of the basis of fish species diversity in relation to phylogenetic, ecological and physiological factors. - appreciate of the direct and indirect impacts and consequences of human activities on population and assemblages. - develop the ability for critical and synthetic thinking.		
Pre-requisites	Pass in BIOL1121 or BIOL0603 or BIOL0625 or BIOL0604 or BIOL0600		
Offer in 2012 - 2013	2nd sem	**Examination**	May

Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 36 hours of laboratory, student-centred learning or field work
Assessment Method	One 2-hour written examination (60% weighting) and continuous assessment (40% weighting) from laboratory reports, essays or other assignments
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. . Little evidence of clear attention to thoughtful and reflective thinking. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	G. Helfman, B. Collette and D. Facey: The Diversity of Fishes (Blackwell Science, 1997) Y. Sadovy & A. S. Comish: Reef Fishes of Hong Kong (HKU Press, 2000) A list of reading material will be provided during the course.
References	TBC
Course Website	http://ecology.hku.hk/vsb/lsc/biol2607/ModHome.htm
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2610 Marine biology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr M Yasuhara, Biological Sciences		
Course Aim	This course provides an introduction to the physical, chemical, and biological processes that occur in oceans and explains the importance of the oceans to all life on earth. The emphasis is on how marine organisms interact with each other and with their environment by considering various ecosystems, as well as the adaptations of marine life to their particular habitats. Students will explore adaptations that allow species to thrive and form the complex web of ocean life. Specific examples from South East Asia, the South China Sea and Hong Kong will be included.		
Course Contents	An introduction to oceanography, ocean topography (continental margins and ocean basins), marine sediments, waves and tsunamis, physical properties of seawater, marine chemistry and nutrients, ocean circulation and currents, satellite oceanography and El Nino-La Nina, phytoplankton and primary productivity, zooplankton, nekton (sharks, tunas and sunfishes), marine mammals (dolphins and whales), neritic benthic ecosystems, coral reefs, coral communities in Hong Kong, deep-sea ecosystems (deep-sea pelagic, deep-sea benthic and hydrothermal vent communities), global climate change and its effects on the oceans, and ocean acidification.		
Learning Outcomes	On successful completion of the course, students should be able to: - appreciate the importance of the oceans to life on earth - describe the characteristics of some of the major habitats of the oceans and explain how marine organisms have adapted to their particular environments - understand some of the physical, chemical and geological processes in the oceans and how they relate to or influence marine life - demonstrate first-hand experience in the use of hydrographical and marine biological field sampling equipment - understand how global climate change will affect the oceans and human society		
Pre-requisites	Pass in BIOL0603 or BIOL0625 or BIOL0604 or BIOL0605 or BIOL0600 or EASC0105 or ENVS1002		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 4 hours tutorial; 12 hours laboratory work; 4 hours group work/project and 4 hours field work		
Assessment Method	One 2-hour written examination (50% weighting), course assessment (20% weighting), test (10% weighting), laboratory report (10% weighting) and group presentation (10% weighting)		
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.
Textbooks	J. W. Nybakken: Marine Biology: An Ecological View (Benjamin Cummings, 2000) Levinton: Marine Biology: Function, Biodiversity, Ecology (Oxford University Press, 2008) Speight and Henderson: Marine Ecology: Concepts and Applications (Wiley-Blackwell, 2010)	
References	TBC	
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2610/	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2611 Systematics & phylogenetics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Prof R M K Saunders, Biological Sciences		
Course Aim	To give students an understanding of the principles of systematics and phylogenetics and an appreciation of current trends and controversies. Systematics forms an invaluable grounding for many fields of biology (including anatomy, ecology, population biology and evolutionary biology), and enables the integration of a wide range of techniques (including anatomy, biochemistry, chemistry, molecular biology, cytology, palaeontology and ethology).		
Course Contents	Currrent classificatory theories: phenetic systematics (classifications based on overall resemblances) and cladistics (evolutionary reconstruction). The species concept. Sources of taxonomic data: morphology & anatomy, biochemistry, chemistry, molecular biology, cytology, and ethology. Causes of taxonomies complexity: environmental factors; hybridization; breeding systems. Principles of nomenclature. Laboratory sessions will be aimed at illustrating taxonomic procedures and problems; students will not be expected to memorize large numbers of scientific names.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain taxon concepts (with particular reference to species) and show how multivariate statistical methods can be applied below the species level. - Describe the principles behind maximum parsimony methods of phylogenetic reconstruction (including sister-group relationships, out-group comparison, homoplasy and the assessment of clade stability). - Evaluate the diversity of sources of taxonomic data, and explain the importance of specific data sources. - Recognise the main causes of taxonomic complexity, and identify appropriate solutions. - Understand the principles of nomenclature in order to interpret the previous application of scientific names are validly publish new names.		
Pre-requisites	Pass in BIOL1121 or BIOL0604		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 18 hours of laboratory and 18 hours (minimum) group work/project		
Assessment Method	One 2-hour written examination (80% weighting), continuous assessment of practical work (10% weighting) and laboratory report (10% weighting)		
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 evidence of extensive background reading and use of named examples. Show evidence of significant critical abilities and logical thinking. Apply highly effective presentation skills. Demonstrate effective use of data and results to draw appropriate and insightful conclusions. Show evidence of integration of a wide range of appropriate theories, principles, evidence and techniques.
B	Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with evidence of some background reading and use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills. Demonstrate use of data and results to draw appropriate and insightful conclusions. Show evidence of general integration of appropriate theories, principles, evidence and techniques.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes, with evidence of limited background reading and use of named examples. Show evidence of some critical abilities and logical thinking. Apply moderately effective presentation skills. Demonstrate mostly correct use of data and results to draw appropriate and insightful conclusions. Show evidence of partial integration of appropriate theories, principles, evidence and techniques.
D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes, with insufficient evidence of background reading and use of named examples. Show evidence of limited critical abilities and logical thinking. Apply limited presentation skills. Demonstrate limited ability to use data and results to draw appropriate and insightful conclusions. Show evidence of limited integration of appropriate theories, principles, evidence and techniques.
Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes, with no evidence of background reading or use of named examples. Show little or no evidence of critical abilities and logical thinking. Presentational skills are minimally effective or ineffective. Misuse of data and results to draw appropriate conclusions. Little or no evidence of integration of appropriate theories, principles, evidence and techniques.

Textbooks	E. Mayr & P. D. Ashlock: Principles of Systematic Zoology (McGraw-Hill, 1991, 2nd ed.) W. S. Judd et al.: Plant Systematics - A Phylogenetic Approach (Sinauer, 1999)
References	TBC
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2611/
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2612 Conservation ecology (6 credits)		**Academic Year**	**2012**

Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Prof Y J Sadovy, Biological Sciences		
Course Aim	To introduce students to the theory and practice of conservation and to provide students with a thorough understanding of practical, economic and management skills required for proficiency in conservation biology. Our ultimate aim is to promote an understanding of the natural biodiversity, the threats to it, and the best ways to manage them. We hope these will be your aims too, and that you will be able to use the skills and knowledge you learn from the course to reduce the local, regional and global loss of biodiversity.		
Course Contents	Among the many environmental issues, the most serious is the increasingly rapid loss of biodiversity. This loss is irreversible on a human timescale and will reduce the options available to all future human generations. Conservation Biology/Ecology is the science of preserving biological diversity. This course also provides insights to the many benefits and services that nature offers and explores strategies for management options to sustain ecological integrity and production. It is an inexact, applied, mission-orientated, multidisciplinary science which, like medicine, has built-in values: to a conservation biologist, as to a doctor, it matters whether the patient lives or dies. It is also a very new science, bringing together elements from ecology, environmental science, forestry, resource management and many other fields. The course is designed to provide the knowledge, theories, and research related to biodiversity conservation. Our teaching focuses on biodiversity conservation, conservation issues associated with climate change, the key theoretical underpinning of biodiversity conservation and an introduction to conservation legislation and economics. We emphasis on the integration of knowledge, skills and abilities that are required to practice conservation. Our problem based learning approach will require students to actively participate in their group project/class room debate by researching.		
Learning Outcomes	On successful completion of this course, students should be able to: - develop a framework for critical thinking about biodiversity, environment and human interaction - understand why species are becoming extinct and predict which ones will be most vulnerable - understand the importance of the threat of tropical deforestation, marine and coastal degradation, and habitat fragmentation in species extinction, and explain the main forces behind habitat and biodiversity loss - understand the principles of population viability analysis, the basis of single-species conservation management and the role of ex situ conservation, ecological restoration and reintroduction in conservation - outline the legal and administrative basis for conservation in Hong Kong and the world - appreciate the roles and relationships of economic, social and environmental sciences in the conservation of biodiversity		
Pre-requisites	Pass in BIOL1106 or BIOL1121 or BIOL0604 or ENVS1002 or BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 8 hours tutorial; 8 hours group work/project and 10 hours field work		
Assessment Method	One 2-hour written examination (60% weighting), continuousus assessment (20% weighting), test (10% weighting) and group presentation (10% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	R. B. Primack: Essentials of Conservation Biology (Sinauer, 2006, 4th ed.) V. D. Fred: Conservation biology [electronic resource]: foundations, concepts, applications (Springer, 2008) M.L. Hunter and J.P. Gibbs: Fundamentals of Conservation Biology (Blackwell, 2007, 3rd Ed) William J. Sutherland: The Conservation Handbook: Research, Management and Policy (Blackwell Science, 2008)		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2612/		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2614 Environmental toxicology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr J D Gu, Biological Sciences		
Course Aim	To introduce students to the basic principles of environmental and ecological toxicology by analysis of the fate of pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-response will be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes and enzymes involved will be highlighted. Specific cases of toxicity will be presented and discussed.		
Course Contents	1. Environmental chemistry of pollutants and their toxicity and factors governing toxic effects, bioaccumulation and		

	biomagnification 2. Partitioning and transformation of environmental pollutants 3. Quantitative toxicology using dose-response approaches 4. Emerging endocrine-disrupting chemicals and carcinogens at molecular levels 5. Elimination of pollutants from the environments 6. Laboratory testing of toxicity and review various adsorption isotherm models
Learning Outcomes	On successful completion of this course, students should be able to: - understand fate and distribution of chemicals in various compartments of the ecosystem - understand toxicity through adsorption, metabolism, elimination and target site and quantitative analysis - understand mechanism of toxicity from specific pollutants of choice - understand specific biochemical processes and enzymes involved in pollutants transformation and mineralization - understand appropriate techniques in environmental cleaning up
Pre-requisites	Pass in BIOL2606 or CHEM1007 or CHEM1009 or CHEM2102 or EASC0118 or EASC1122
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures; 36 hours of laboratory, assignment; and seminar
Assessment Method	One 2-hour MCQ and written answer examination (60% weighting) and student-based assessment (40% weighting). Student-based assessment includes laboratory report, assignment, presentations or other forms.
Course Grade	A+ to F
Grade Descriptors	**A**: Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. **B**: Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. **C**: General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. **D**: Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. **Fail**: Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Textbooks	D.G. Crosby: Environmental Toxicology and Chemistry (Oxford, 1998)
References	W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd ed.) R. Mitchell and J.-D. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2614/
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2615 Freshwater ecology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Prof D Dudgeon, Biological Sciences		
Course Aim	This course introduces freshwater science by integrating the physical and biological components of rivers and their drainage basins in the context of sustaining human livelihoods and biodiversity. Conservation and management of lakes and maintenance of water quality are considered also. Case studies are used to illustrate the principles of river science and human use of drainage basins. Emphasis will be placed upon conservation of freshwater biodiversity in Asia in the context of increasing human modification of ecosystems, habitat degradation and water scarcity.		
Course Contents	The amount of water on Earth is fixed. Less than 0.01% of the world's water is in lakes and rivers, yet this water hosts 10% of the Earth's species. Global water use has increased 300% since 1950 and is growing faster than the Earth's population; many people in Asia already face water stress. This course introduces the physicochemical processes involved in the hydrological cycle and flow of water in drainage basins, as well as their seasonal fluctuations, and describes the main longitudinal changes that occur along rivers and their floodplains. Energy flows in freshwater ecosystems are described with particular reference to the transfer of materials between water and land and the relative importance of aquatic primary production versus energy derived from detrital inputs from the land. The range of organisms associated with Asian fresh waters are introduced and their functional roles explained, and students will become familiar with some common Hong Kong species. The dependence of humans on freshwater ecosystems and the role they play in sustaining livelihoods is explained, together with the causes and consequences of human modification of fresh waters, and the implications for conservation of aquatic biodiversity. Finally the range of management strategies used to reduce or mitigate human impacts on freshwater ecosystems and maintain water quality are introduced.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the hydrological cycle, and understand the main sources and pathways of energy in freshwaters, and the importance of land-water interactions in determining aquatic productivity. - Describe the composition of the freshwater biota (major groups) and their functional roles in aquatic ecosystems, and identify some of the common animals that occur in Hong Kong fresh waters. - Describe the results of modification of freshwater ecosystems by humans, list the main threats to freshwater biodiversity in Asia, explain why freshwater biota are vulnerable to human impacts, and indicate the management		

	strategies used to reduce or mitigate them.
Pre-requisites	Pass in (BIOL0601 or BIOL0600 or BIOL0625) and BIOL0604
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	At least 26 hours of lectures, plus up to 40 hours of project work and field trips to local streams and wetlands.
Assessment Method	One 2-hour written examination (70% weighting) and continuous assessment of coursework, project report, and/or class tests (30% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Evidence of original logical (or coherent) thought, strong analytical (or critical) abilities and a thorough grasp of the subject as demonstrated by background reading and excellent use of named (organism) examples. Show excellent presentational, analytical skills and/or lab/field skills, and substantial knowledge of general freshwater biodiveristy or selected taxa. Excellent or outstanding (for A+) work relative to what is required at degree level. B: Evidence of analytical (or critical) abilities and logical (or coherent) - but not necessarily original - thinking, a good grasp of the subject as demonstrated by background reading and use of named (organism) examples. Show good presentational, analytical and/or lab/field skills, and knowledge of general freshwater biodiversity or selected taxa. Work more than sufficient for what is required at degree level. C: Evidence of some analytical (or critical) abilities and logical (or coherert) thinking with an adequate (but incomplete) grasp of the subject, but little or no evidence of original thinking, with limited background reading and use of named (organism) examples. Show fair presentational, analytical and/or lab/field skills, and some knowledge of general freshwater biodiversity or selected taxa. Work sufficient for what is required for degree level. D: Evidence of retention of a minimum of relevant information of the subject (i.e. knowledge is very incomplete), with limited organizational, analytical or presentational skills. Shows insufficient evidence of background reading, or familiarity with lab/field techniques or freshwater biodiversity. Work merely (for D+) or barely (D) adequate for what is required at degree level. Fail: Evidence of poor or inadequate knowledge and understanding of the subject, and a lack of coherence, poor organization and/or excessive irrelevancy. Little or no evidence of familiarity with relevant reading material and lab/field techniques, or any knowledge of freshwater biodiversity. Work fails to reach degree level.
Textbooks	Allan, J.D. & Castillo, M.M. (2007). Stream Ecology. Springer. The Mekong River Awareness Kit (RAK:http://mekong.riverawarenesskit.org/html/rak_frameset.html) A training tool developed by an international team (including the course coordinator) that contains information on the physical and biological features of rivers, and shows how human livelihoods depend on river health.
References	A list of references available in HKU library will be provided for each lecture.
Course Website	http://ecology.hku.hk/vsb/lsc/biol2615/ModHome.htm
Remarks	Taking both BIOL2608 and BIOL2615 are recommended. More information about this course, including details of contents, assessment, aims and objectives, can be found at the Learning Support Centre: http://www.biosch.hku.hk/ecology/lsc/biol2615/ (This course will be offered subject to a minimum enrollment number)

BIOL2617 Experimental intertidal ecology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Prof G A Williams, Biological Sciences		
Course Aim	To examine the communities of coastal systems: their distribution, composition and the factors which regulate them. This course will examine, using an experimental approach, patterns exhibited by a range of shores and the deterministic and stochastic processes that create and sustain them. Hong Kong shores will be used as examples but comparisons will be drawn from the coastlines of the world.		
Course Contents	The first part of this course describes shores of the marine to brackish water continuum and the communities found on them. Lectures will cover the physical environment of the intertidal (e.g. tides; waves; geological and hydrological processes) the resultant variations in exposure and shore types and consequent distribution of animals and algae on these shores (vertical and horizontal zonation patterns) with specific Hong Kong examples. The second part of the course uses an experimental approach (e.g. sampling methodology; manipulative techniques; experimental design and data analysis) to investigate the factors (e.g. predation; herbivory; competition; disturbance; succession; patchiness and recruitment; supply side ecology) that structure these shores, with particular focus on rocky intertidal shores.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the physical environmental factors (e.g., waves, tides) shaping the intertidal environment and how they interact with geographic features to produce different kinds of shores (e.g., sandy shores, mangroves) - understand the factors limiting species distribution patterns on the vertical intertidal gradient and appreciate methods to measure and investigate these patterns - identify and quantify the distribution of a variety of local species on different Hong Kong shores. - review, critique and design experimental studies to investigate patterns (e.g., zonation) and processes (e.g., herbivory, competition) in intertidal areas - explain the role of biological processes (e.g., predation, succession) and their interaction with the physical environment in shaping intertidal communities - plan, design, execute, analyse and present a simple experimental study on intertidal ecology.		
Pre-requisites	Pass in BIOL0126 or BIOL0603 or BIOL0604 or BIOL0625 or BIOL1608 or BIOL2608 or ENVS1002		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 36 hours field trips/project work		
Assessment Method	One 2-hour written examination (60% weighting) and assessed work (40% weighting)		
Course Grade	A+ to F		

Grade Descriptors	A	Evidence of original, logical (or coherent) thought, strong analytical and critical abilities and a thorough grasp of the subject as demonstrated by background reading and excellent use of named (organism) examples. Show excellent presentational, analytical skills and/or lab/field skills, and demonstrate substantial knowledge of general intertidal ecology and excellent experimental design and analysis skills.
	B	Evidence of analytical (or critical) abilities and logical (or coherent), but not necessarily original, thinking, a good grasp of the subject as demonstrated by background reading and use of named (organism) examples. Show good presentational, analytical and/or lab/field skills, and demonstrate knowledge of general intertidal ecology and good experimental design and analysis skills.
	C	Evidence of some analytical (or critical) abilities and logical (or coherent) thinking with an adequate (but incomplete) grasp of the subject, but little or no evidence of original thinking, limited background reading and use of named (organism) examples. Show fair presentational, analytical and/or lab/field skills, and demonstrates some knowledge of general intertidal ecology and adequate abilities of experimental design and analysis.
	D	Evidence of retention of a minimum of relevant information of the subject (i.e. knowledge is very incomplete), with limited organizational, analytical or presentational skills. Show insufficient evidence of background reading, or familiarity with lab/field techniques. Poor knowledge of general intertidal ecology and misunderstanding of experimental design and analysis.
	Fail	Evidence of poor or inadequate knowledge and understanding of the subject, and a lack of coherence, poor organization and/or excessive irrelevancy. Limited or no evidence of familiarity with relevant reading material and lab/field techniques, or knowledge of general intertidal ecology, and misuse of experimental design and analysis skills.
Textbooks	Morton, B. & Morton, J.: The Seashore Ecology of Hong Kong (Hong Kong University Press, 1983) Little, C. & Williams, G.A. & Trowbridge, C.D.: The Biology of Rocky Shores (Oxford University Press, 2009)	
References	TBC	
Course Website	http://ecology.hku.hk/vsb/lsc/biol2617/ModHome.htm	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL2619 Terrestrial ecology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	TBC, Biological Sciences		
Course Aim	To enable motivated students to acquire the knowledge and skills needed to solve real problems in terrestrial ecology.		
Course Contents	This course will focus on the ecology of terrestrial habitats. The emphasis will be on the tropics, especially tropical East Asia, but the course will also include an overview of patterns and processes on a global scale. Students will first learn about the geological history of the land mass on earth, the biogeography and broad distribution of major terrestrial ecosystems in Tropical East Asia. Then, students will begin to learn different important processes including herbivory, carnivory, pollination, seed dispersal and energy flow in terrestrial ecosystems. The second half of the course will start with the degraded terrestrial ecosystems nowadays and the important process of ecological succession. Restoration ecology and how tropical forests can be restored will then be introduced. Two other major threats to terrestrial ecosystems including alien invasive species and wildfire will also be addressed. The course content is delivered by lectures as well as problem-based learning exercises. The practical component of the course will introduce students to the basic field techniques used in terrestrial ecology, including vegetation surveys, bird community studies, small mammal trapping, the use of infrared-triggered cameras to survey larger mammals, radio-tracking, and methods for quantifying invertebrate abundance.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the patterns and processes of terrestrial ecosystems in their pristine form and disturbed state. - Understand the various threats to terrestrial ecosystems, methods to reduce the impact of those threats, and methods to manage and restore degraded terrestrial ecosystems. - Plan and conduct baseline study of terrestrial biodiversity. - Develop the skill to be an active learner through the problem-based learning exercises.		
Pre-requisites	Pass in BIOL0604 or BIOL0605 or BIOL0625 or BIOL0600 or BIOL0603 or ENVS1002		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures, 14 hours tutorials, 16 hours laboratory and field work and 70 hours reading/self study		
Assessment Method	One 2-hour written examination (50% weighting) and assessment of course work (50% weighting)		
Course Grade	A+ to F		

Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Corlett R.T. : The Ecology of Tropical East Asia (Oxford University Press, 2009). Dudgeon D. and Corlett R. T.: Ecology and Biodiversity of Hong Kong (Friends of the Country Parks, Hong Kong)	

References	To be provided in classes
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2619/
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2621 Plant structure & evolution (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Prof R M K Saunders, Biological Sciences		
Course Aim	To survey the form and function of the vascular plant body, with particular emphasis on the evolutionary significance of structures. This course forms a basis for understanding plant physiology, ecology, systematics and phylogenetics.		
Course Contents	The course will investigate various cell, tissue and organ types in the vascular plant body, with functional explanations for their diversity and discussions of the value of such knowledge in understanding plant phylogeny. Information on plant structure will be integrated with our current understanding of developmental genetics and taxonomic relationships derived from molecular phylogenetic research. Topics such as food storage, strength, water conduction, growth and development, pollination, fertilization, fruit and seed dispersal, germination, etc., will be discussed.		
Learning Outcomes	On successful completion of this course, students should be able to: - recognise the main plant cell types and explain how cells are integrated to form specific primary tissues (such as the xylem and phloem). - describe the developmental changes that occur in primary tissues with the onset of secondary growth. - describe the structure, function and development of secondary vegetative structures (wood and bark). - integrate knowledge of the genetic control of floral development with the evolution of organ diversity. - describe the structure of fruits from a functional perspective, and recognise how these structures are derived from the flower. - explain how seeds develop after fertilization of the ovule, and how differences in seed structure influences germination patterns.		
Pre-requisites	Pass in BIOL0604; and Not for students who have already passed in BIOL2616 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 36 hours of laboratory and student-centred learning		
Assessment Method	One 2-hour written examination (80% weighting), and continuous assessment (20% weighting)		
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 evidence of extensive background reading and use of named examples. Show evidence of significant critical abilities and logical thinking. Apply highly effective presentation skills. Demonstrate effective use of data and results to draw appropriate and insightful conclusions. B: Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with evidence of some background reading and use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills. Demonstrate use of data and results to draw appropriate and insightful conclusions. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes, with evidence of limited background reading and use of named examples. Show evidence of some critical abilities and logical thinking. Apply moderately effective presentation skills. Demonstrate mostly correct use of data and results to draw appropriate and insightful conclusions. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes, with insufficient evidence of background reading and use of named examples. Show evidence of limited critical abilities and logical thinking. Apply limited presentation skills. Demonstrate limited ability to use data and results to draw appropriate and insightful conclusions. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes, with no evidence of background reading or use of named examples. Show little or no evidence of critical abilities and logical thinking. Presentational skills are minimally effective or ineffective. Misuse of data and results to draw appropriate conclusions.		
Textbooks	P. Rudall: Anatomy of Flowering Plants, 3rd ed. Cambridge Univ. Press (2007) P.H. Raven, R.F. Evert & S.E. Eichhorn: Biology of Plants, 7th ed. Freeman (2005)		
References	A list of additional reading material will be provided during the course.		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol2621/		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL2622 The biology of marine mammals (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Dr L Karczmarski, Biological Sciences		
Course Aim	Few other groups of animals have captured the public's imagination the way marine mammals, especially whales and dolphins have. This course covers the evolutionary biology, ecology, behaviour, and conservation of marine mammals: whales, dolphins and porpoises (cetaceans), seals, sea lions, fur seals and walruses (pinnipeds), manatees and dugongs (sirenians). Students will learn to understand the ecology of mammalian life in the aquatic environment, their role in the marine ecosystem, their behavioural complexity, and what are the current threats to these animals in the human-dominated world.		
Course Contents	The course begins with an overview of marine mammal species and their global distribution, followed by a review of the various adaptations that have evolved to meet the challenges of the marine environment. Next, the course		

	discusses the life history, reproductive strategies, ecology and population dynamics of marine mammals, highlighting the similarities and differences between species in this taxonomically diverse group of animals. This is followed by sessions on behaviour and behavioural ecology; here we discuss animal movement, diving and ranging behaviour, foraging strategies, grouping pattern and social behaviour, behavioural complexity, cognition, and social strategies that guide the daily lives of these animals. The course concludes with a discussion of human influences on the fate of marine mammals, examples of critically endangered species and populations, and a review of conservation and management strategies; our emphasis is on the importance of applying the knowledge of population ecology, behaviour and behavioural ecology in ensuring long-term effective conservation of marine mammal populations. This course is designed for 2nd and 3rd year students; it includes field trips, discussions of current scientific research, recent discoveries and innovative research techniques. Students will undertake independent literature-searches and will discuss their projects during classroom debates, training their skills in conceptual and analytical approaches to science.
Learning Outcomes	On successful completion of this course, students should be able to: - appreciate marine mammal diversity and biogeography. - understand how mammals adapt and function in an aquatic environment and their role in the marine ecosystem. - understand and appreciate the complexity of interactions between environmental selective pressures and marine mammal behaviour, population structure and demography. - appreciate the socio-ecological diversity and behavioural complexity of marine mammals. - think analytically in terms of behavioural ecology, animal socio-behavioural and ecological needs, anthropogenic impacts and the rapidly changing global marine environment.
Pre-requisites	Pass in BIOL0604 or BIOL0605 or BIOL0600
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 36 hours of field trips and project work/seminars/student-centred learning
Assessment Method	One 2-hour written examination (50% weighting) and continuous assessment of coursework, seminars and project reports (30% weighting), and class tests/other assignments (20% weighting)
Course Grade	A+ to F
Grade Descriptors	

A	Evidence of a thorough grasp of the subject in a broader comparative perspective as demonstrated by background reading and excellent use of named examples and case studies. Evidence of independent critical thought with excellent use of a broad range of fundamental concepts to draw insightful and logical conclusions. Show eagerness to learn, great abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.
B	Evidence of a good grasp of the subject as demonstrated by some background reading and appropriate use of named examples and some case studies. Evidence of good critical thought, although not necessarily original. Good and very good (but not outstanding) abilities of independent work, effective presentation skills with good analytical and logical argumentation. Good general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for what is required at degree level.
C	Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partial abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.
D	Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) case studies. Insufficient evidence of background reading, limited abilities of critical independent thinking, and not particularly effective presentation skills with generally weak logical argumentation and restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.
Fail	No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.

Textbooks	Hoelzel, A.R. (ed). Marine mammal biology: An evolutionary approach (Blackwell Science, 2002) Reynolds III, J.E. & Rommel, S.A. (eds). Biology of marine mammals (Smithsonian Institution Press, 1999) Perrin, W.F., Wursig, B. & Thewissen, J.G.M. (eds). Encyclopedia of marine mammals (Academic Press 2008) Mann, J., Connor, R.C., Tyack, P.L. & Whitehead, H. (eds). Cetacean societies: Field
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL2625 Animal behaviour (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Dr L Karczmarski, Biological Sciences		
Course Aim	The science of Animal Behaviour investigates everything animals do; it involves studying specific behaviours, their underlying mechanisms and functions; exploring the ways in which animals interact with each other, with their physical environment and other organisms; how animals find and defend resources, avoid predators, choose mates, reproduce, and care for their young; how complex animal societies are formed and how behaviour of an individual affects the structure of a population. This course will provide a conceptual framework for exploring and understanding animal behaviour.		
Course Contents	This course will introduce students to scientific reasoning and conceptual basis of the understanding of animal behaviour and behavioural ecology. What causes specific behaviour and what are the underlying mechanisms? How does behaviour develop within the individual's lifetime and what functions does it serve? For example; why are some species monogamous while others are polygamous? What makes one organism the hunter and another the hunted? Several animal species, including humans, tend to live in groups; social life is among the most complex and effective survival strategy. However, how could, for instance, the birth of sterile castes, like in bees, be explained through an evolving mechanism which emphasizes the reproductive success of as many individuals as possible? Why, among animals living in small groups like squirrels, would an individual risk its own life to save the rest of the group? In this course, based upon ecological and evolutionary principles, students will learn to think		

	within the paradigm of behavioural ecology and understand the causes, functions, development, and evolution of behaviour. We will discuss several classical studies that form the foundation of this field, as well as more recent research that represents the current concepts which have led to modern understanding of animal behaviour. We will also illustrate the links between the recent extraordinary advances in behavioural ecology and socio-ecology with their application in animal conservation.
Learning Outcomes	On successful completion of this course, students should be able to: - Learn to appreciate the causes, functions, development, and evolution of animal behaviour - Appreciate the complexity of interactions between environmental selective pressures and animal behaviour - Learn the scientific reasoning and methodology in the field of Animal Behaviour, and current theories that form basis for modern understanding of animal behaviour - Appreciate the conceptual framework for investigating and understanding animal behaviour and how to put this framework into practice of collecting and analysing data - Think analytically in terms of behavioural ecology, animal socio-behavioural complexity, and how the understanding of the behaviour of a given species contribute to its conservation
Pre-requisites	Pass in BIOL0604 or BIOL0625
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	22 hours of lectures and 32 hours of project work / seminars / student-centred learning
Assessment Method	One 2-hour written examination (50%) and continuous assessment of seminars, project reports, and other assignments (50%)
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
A	Evidence of a thorough grasp of the subject in a broader comparative perspective as demonstrated by background reading and excellent use of named examples and case studies. Evidence of independent critical thought with excellent use of a broad range of fundamental concepts to draw insightful and logical conclusions. Show eagerness to learn, great abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.
B	Evidence of a good grasp of the subject as demonstrated by some background reading and appropriate use of named examples and some case studies. Evidence of good critical thought, although not necessarily original. Good and very good (but not outstanding) abilities of independent work, effective presentation skills with good analytical and logical argumentation. Good general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for what is required at degree level.
C	Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partial abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.
D	Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) case studies. Insufficient evidence of background reading, limited abilities of critical independent thinking, and not particularly effective presentation skills with generally weak logical argumentation and restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.
Fail	No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.

Textbooks	Bolhuis J.J. & Giraldeau L.A. (2005). The Behavior of Animals: Mechanisms, Function, and Evolution. Blackwell Publishing. Danchin E., Giraldeau L-A. & Cezilly F. (2008). Behavioural Ecology. Oxford University Press. Dugatkin, L.A. (2009). Principles of Animal Behavior (2nd edition). W.W. Norton & Company
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3214 General virology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr B L Lim, Biological Sciences		
Course Aim	This Course provides the fundamental principles of virology so that students can understand the pathogenesis of major viral diseases that affect animal health. The course will prepare students for profession or graduate work in virology, medicine and biotechnology.		
Course Contents	Fundamental Virology 1. Classification and Nomenclature of Viruses 2. Virus structure: Capsid symmetry, Icosahedral symmetry 3. Virus structure: Genetic Materials, Nucleocapsid, Envelope 4. Virus entry: Receptors, uncoating and fusion 5. Virus-Cell interaction 6. RNA viruses: Genome replication and mRNA production 7. Baltimore Class IV (+) s.s. RNA viruses: Picornaviruses 8. Baltimore Class V (-) s.s. RNA viruses: Myxoviruses 9. Ambisense RNA viruses: Bunyaviruses and Arenaviruses 10, 11. Baltimore Class VI (+) s.s. RNA viruses: Retroviruses 12. Baltimore Class III d.s. RNA viruses: Reoviruses 13, 14. Baltimore Class I d.s. DNA viruses: Adenoviruses, Herpesviruses 15. Baltimore Class II s.s. (+) DNA viruses: Parvoviruses 16. Mechanisms of Viral Oncogenesis 17. Anti-viral treatments 18. Viruses as Tools in Medicine and Biotechnology Practical Virology		

	19. Specimen Collection, Transportation and Processing, Quality Assurance & Laboratory Safety 20. Virus isolation, propagation and titration 21, 22. Virus Identification: Immunocytochemical assays, ELISA, Complement Fixation Assay, Hemagglutination and HI assays 23, 24. Neutralization assay and Antiviral assay		
Learning Outcomes	On successful completion of this course, students should be able to: - be familiar with virus classification. and the modes of replication and transmission of various viral families. - gain hand-on experiences on common virological techniques. - carry out researches on virology after taking this course.		
Pre-requisites	Pass in BIOL2303 or BIOL2205 or BIOC2603 or BIOC1003		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 18 hours of laboratory work		
Assessment Method	One 2-hour written examination (80% weighting) and continuous assessment of practical work (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of knowledge required for attaining all the course learning outcomes. Show strong analytical skills and competent ability to acquire knowledge on new development of the subject. Apply 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 evidence of analytical skills and adequate ability to acquire knowledge on new development of the subject. Apply effective lab skills and techniques. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical skills and certain ability to acquire knowledge on new development of the subject. Apply 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 evidence of limited analytical skills and ability to acquire knowledge on new development of the subject. Apply partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical skills and ability to acquire knowledge on new development of the subject. Apply minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	www.tulane.edu/~dmsander/garryfavweb.html Flint, Engquist, Krug: Principles of Virology (ASM Press (279.2.P9), 2000) Wagner & Hewlett: Basic Virology (Blackwell Science (579.2 W132b), 1999) Ackermann,		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL3219 Clinical microbiology and applied immunology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr W Y Lui, Biological Sciences		
Course Aim	The aim is to provide students the knowledge on the practical applications of immunology and microbiology in biological research, clinical analysis and disease diagnosis.		
Course Contents	Basic parameters affecting antigen-antibody interactions Application of antigen-antibody interaction in advanced research: CHIP assay, co-immunoprecipitation, immunohistochemistry and dual Immunofluorescence Principles and application of flow cytometry Techniques in cellular immunology and tumor immunology Microbial pathogens and associated diseases, host immune response, antimicrobial agents and multidrug resistance, epidemiology and prevention of microbial infections Clinical laboratory analyses in serology, haematology, blood banking, microbiology and chemical pathology		
Learning Outcomes	On successful completion of this course, students should be able to: - Apply the principles of antigen-antibody interaction in various advanced research techniques - Demonstrate knowledge on microbial pathogens, mechanisms for their disease-causing, and principles of antibiotic development - Understand the scientific principles of various clinical laboratory analyses - Promote public attention on control of microbial infection and the spread of antibiotic resistance - Know the organization of medical laboratory in a clinic or hospital		
Pre-requisites	Pass in BIOL2205		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and one 4-hour laboratory session per week for 3 weeks		
Assessment Method	One 2-hour written examination (80% weighting) and assessment of practical work (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning		

	A	outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
	B	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
References	Barbara H Estridge, Anna P Reynolds, Norma J Walters: Basic Medical Laboratory Techniques (Delmar Publishers, 4th to latest editons) Joanne M Willey, Linda M Sherwood, and Christopher J Woolverton: Prescott's Principles of Microbiology (McGraw-Hill, 7th edition, 2008, Chapters 31-36, 38) James V Watson: Introduction to Flow Cytometry (Cambridge University Press, 2004)	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL3307 Biotechnology industry (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	TBC, Biological Sciences		
Course Aim	This course provides an overview of the various fields of biotechnologies, the development of a biotechnology product, and the operation of biotechnology companies.		
Course Contents	The course will include a brief history of the biotechnology industry. Research and development of products, scale-up, laboratory screening and clinical trials, regulatory agencies, patents and intellectual properties, quality control, quality assurance, good laboratory practice, good manufacturing practice, microeconomics, financial planning, company organization. Examples of products will be used for illustration.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the terms used in the biotechnology industry, so that students can read and understand the business side of biotechnology. - understand the requirements for the manufacturing of biotechnology drugs and for the establishment of a successful biotechnology company. - understand about the process of discovery and development of a drug.		
Pre-requisites	Pass in BIOL2303 or BIOC2603		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 lectures		
Assessment Method	One 2-hour written examination (about 80% weighting); continuous assessment (tests and essays) (about 20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A		
	B		
	C		
	D		
	Fail		
References	To be announced.		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL3315 Animal biotechnology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr A S T Wong, Biological Sciences		
Course Aim	This course discusses the key concepts and principles involved in animal biotechnology, and their applications in animal industry and molecular medicine.		
Course Contents	Improvement of animal production through genetic selection and animal breeding, sex selection, artificial insemination and embryo transfer. Application of immunological techniques and growth promoting agents in animal reproduction.		

	Genetic biotechnology in animals (transgenics, knockouts and other related technologies): transgenic animals as models in the study of human diseases, as bioreactors for the production of hormones, antibiotics and vaccines and organs for xenotransplantation. Genetically-modified fish and other animals for food production. Nuclear transfer and animal cloning. Advanced molecular biology techniques related to human and animal science basic research, disease diagnosis and development of new therapies. These include but not limited to: genomics, proteomics and bioinformatics; applications of DNA technologies in diagnostic medicine and forensic science; tissue engineering.
Learning Outcomes	On successful completion of this course, students should be able to: - describe key concepts in animal biotechnology and human health - acquire advanced laboratory techniques essential to biotechnology - gain insight into real-world applications in biotechnology
Pre-requisites	Pass in BIOC2603 or BIOL2303
Offer in 2012 - 2013	2nd sem **Examination** May
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures; 18 hours of field trips/tutorials/computer sessions. One of the practical sessions involves the collection of blood and milt samples from anaestherized goldfish.
Assessment Method	One 2-hour examination paper (80% weighting), assessment of course works (20% weighting)
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
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.

Textbooks	TBC
References	Lorne A. Babiuk and John P. Phillips: Animal Biotechnology: Comprehensive Biotechnology (Pergarmon Press) Glick and Pasternak: Molecular Biotechnology (ASM Press, 2003) Suggested readings for each topic will be provided.
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3316 Plant biotechnology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Prof M L Chye, Biological Sciences		
Course Aim	This course covers the principles and applications of plant biotechnology. The significance of plant biotechnology in agriculture and its emerging role in molecular farming for production of biopharmaceuticals and other high-value proteins will be discussed.		
Course Contents	Tools in plant genetic engineering: promoters, selectable markers, assayable markers. Techniques in plant gene transfer: Agrobacterium-mediated transformation, viral vectors, protoplasts, biolistics and microinjection. Nuclear transformation and plastid transformation. Genetic engineering of commercially useful biosynthetic pathways in plants. Posttranscriotional gene silencing. Production of crops resistant to phytopathogens and pests. Herbicide-resistant crops. Plants as bioreactors for molecular farming: transgenic and transplastomic plants for the production of recombinant biopharmaceutical proteins including growth hormones, antibodies and subunit vaccines. Transformed plants for the production of industrial enzymes. Transformed plants in agriculture: production of phytases in animal feed for improved phosphorus utilization. Biodegradable plastics. Biofuels. Genetically-modified crops and food products: regulation, testing and labeling.		
Learning Outcomes	On successful completion of this course, students should be able to: - Acquire the key concepts in plant biotechnology - Acquire some laboratory techniques on plant biotechnology - Gain an insight into real-life applications in plant biotechnology		
Pre-requisites	Pass in BIOC2603 or BIOL2303		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures and 18 hours of laboratory/computer and poster sessions		

Assessment Method	One 2-hour written examination (80% weighting) and assessment of laboratory/posters (20% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough and complete mastery of extensive knowledge and skills required for attaining the learning outcomes in Plant Biotechnology. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations in plant biotechnology. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes in plant biotechnology. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Some evidence of coherent and logical thinking, accompanied with limited analytical and critical skills. Show limited ability to apply knowledge in plant biotechnology. Show limited or barely effective organizational and presentational skills. Fail: Fail to demonstrate command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. No evidence in ability to apply knowledge in plant biotechnology. Ineffective organizational and presentational skills.
Textbooks	Chrispeels M.J. and D.E. Sadava: Plants, genes, and agriculture (Jones and Bartlett) Selected papers will be provided.
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3317 Microbial biotechnology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr J S H Tsang, Biological Sciences		
Course Aim	This course is intended for students who would like to understand the application of modern microbiology in biotechnology. The microbial systems being used include different types of viruses, bacteria, fungi and algae. At the end of the course the students are expected to know the parameters and conditions that affect the yield of production and the systems available for the expression of vaious types of biotechnology products.		
Course Contents	Upstream and downstream processing will be briefly described to equip the students with the background for microbial biotechnology. The latest advances in microbial expression systems using viruses, bacteria, yeasts and algae will be reviewed. Specific examples on the use of these systems will be provided. These include but not limited to production of recombinant vaccines, secondary metabolites, food and food additives, industrial enzymes and biopesticides as well as bioremediation and medical diagnostics.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain the fundamental biochemical concepts underlying the industrial production of selected microbial biotechnology products - understand the importance of the current recombinant technology for large-scale manufacturing of various protein products - describe the major expression systems, understand their purposes, advantages, and disadvantages - deliver a professional group presentation on a self-decided topic related to microbial biotechnology		
Pre-requisites	Pass in BIOC2603 or BIOL2303		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 18 hours of group presentations		
Assessment Method	One 2-hour examination paper (70% weighting) and course work assessment (30% weighting)		
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. Demonstrate deep understanding of the subject. Demonstrate integration of the full range of appropriate theories, principles, evidence and techniques. Illustrate insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining most of the course learning outcomes. Demonstrate substantial grasp of the subject. Demonstrate general integration of theories, principles, evidence and techniques. Illustrate critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete knowledge and skills required for attaining most of the course learning outcomes. Demonstrate general but incomplete grasp of the subject. Demonstrate some partial integration of theories, principles, evidence and techniques. Illustrate use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Apply moderately effective organizational and presentational skills. D: Demonstrate limited knowledge and skills required for attaining some of the course learning outcomes Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Show limited integration of theories, principles, evidence and techniques. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no knowledge and skills required for attaining the course learning outcomes. Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Show little or no or inapt integration of theories, principles, evidence and techniques. Show limited use of secondary sources and no critical comparison of them. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	A. N. Glazer and H. Nikaido: Microbial Biotechnology: Fundamentals of Applied Microbiology (W. H. Freeman & Co., 1995) A. L. Demain, J. E. Davies, R. M. Atlas, G. Cohen, C. L. Hershberger, W-S. Hu, D.		

References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3321 Biological sciences project (12 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Prof G A Williams, Biological Sciences		
Course Aim	To provide experience of biological research by planning and carrying out a project under the supervision of a member of staff.		
Course Contents	Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project work under the guidance of their supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - Critique and review appropriate scientific literature; - Use this information to generate a scientifically relevant research question; - Develop and formulate scientific hypotheses to test this question; - Design and undertake practical research work to formally test the hypotheses proposed; - Analyse and evaluate the data collected to test the hypotheses; - Present data in a professional manner to illustrate the outcomes; - Draw an objective series of conclusions based on the experimental work; - Highlight and discuss their research findings and place them into a holistic scientific context; - Submit their work following a specified journal format; and - Present their work as a scientific conference talk.		
Pre-requisites	Pass in at least 18 credits of BIOL0XXX or BIOL1XXX level courses and 18 credits of BIOL2XXX or BIOL3XXX level courses; and Cumulative GPA of 3.0 or above		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Some formal lectures, attendance of seminars, then supervised practical work. The student should expect to spend at least 144 hours on the project.		
Assessment Method	A dissertation of about 9,000 - 12,000 words (80% weighting) should be submitted by April 15th and a research seminar (20% weighting).		
Course Grade	A+ to F		
Grade Descriptors	A: Evidence of complete or near-complete understanding and a thorough grasp of the subject matter as demonstrated by attainment of all learning outcomes. Excellent critique and knowledge of relevant literature and identification of research hypothesis. Well designed experimental approach to test research hypothesis. Show excellent organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate comprehensive, critical, assessment of results and professional presentation of research work. B: Evidence of near-complete understanding and a good grasp of the subject matter as demonstrated by attainment of the majority of learning outcomes. Good critique and knowledge of relevant literature and identification of research hypothesis. Appropriately designed experimental approach to test research hypothesis. Show good organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate effective, critical, assessment of results and good presentation of research work. C: Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment of most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis. Adequately designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate adequate but not necessarily critical, assessment of results and presentation of research work. D: Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate confused and poorly organized assessment of results and limited presentation of research work. Fail: Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are not attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presentation of research work.		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3321/		

BIOL3325 Molecular phylogenetics and evolution (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	25
Course Co-ordinator	Dr V Dvornyk, Biological Sciences		
Course Aim	The purpose of this course is to provide a comprehensive overview of state-of-the-art molecular systematics and phylogenetic research, focusing on in depth coverage of the latest techniques. The treatment of theoretical issues in formal lectures is coupled with practical workshops. - acquisition of the sequences from the databases - DNA and protein sequence assembly and alignment - phylogeny reconstruction using parsimony, distance based, and maximum likelihood approaches - introduction to relevant software for phylogenetics - methods for the evaluation of phylogene trees		
Course Contents	Introduction to molecular systematics and phylogenetics. Tree of life. Obtaining, storing and archiving specimens and tissue samples for use in molecular studies. Sources of molecular data, experimental design for molecular studies, taxon sampling and marker choice. Overview of basic laboratory methods for data collection (DNA		

	isolation, PCR, DNA sequencing). Sequence editing and aligning; utilizing public sequence databases. Estimation of nucleotide polymorphism and diversity. Methods for phylogeny reconstruction: parsimony, distance methods, maximum likelihood, Bayesian methods. Statistical methods for the evaluation of phylogenetic trees. Software for phylogeny reconstruction. Molecular markers in conservation and ecological genetics. Phylogenies for different organisms. Biogeography vs. phylogeography using molecular data.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the fundamental principles of molecular phylogenetics. - Understand the purposes each method is used for and be able to choose the most appropriate method(s) for the analysis of given data. - Understand the advantages and disadvantages of the methods. - Acquire practical skills for the analysis of molecular data.		
Pre-requisites	Pass in BIOL2303 or BIOL2116 or BIOL2119 or BIOL2611		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 36 hours of computer laboratory/tutorial/projects		
Assessment Method	One 2-hour MCQ and written examination (60% weighting), continuous assignments (40%)		
Course Grade	A+ to F		
Grade Descriptors			

A	Demonstrate comprehensive knowledge and an advanced level of skills sufficient for achieving all the goals and expected learning outcomes of the course. Show deep understanding of the course subject. Excellent ability to efficiently combine and apply the relevant theories, principles, and methods taught in the course. Advanced skills in possession and application of the methods and software for evolutionary analysis of real data. Excellent ability to collect, systematize, analyze and critically evaluate data from various sources and to quote them appropriately. Excellent presentational skills.
B	Demonstrate good knowledge and good level of skills sufficient for accomplishing most of the goals and expected learning outcomes of the course. Demonstrate good understanding of the course subject. Show good ability to combine and to apply theories, principles, and methods taught in the course. Substantial skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show good ability to collect, systematize, analyze and critically evaluate data from various sources and to quote them appropriately. Good presentational skills.
C	Demonstrate basic knowledge and basic level of skills sufficient for accomplishing most of the goals and expected learning outcomes of the course. Demonstrate general understanding of the subject. Show some ability to combine and to apply theories, principles and methods taught in the course. Basic skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show general ability to collect, systematize, analyze and evaluate data from various sources and to quote them appropriately. Basic presentational skills.
D	Demonstrate incomplete knowledge and weak skills sufficient for accomplishing only some of the goals and expected learning outcomes of the course. Demonstrate poor understanding of the subject, Show poor ability to combine and to apply theories, principles, and methods taught in the course. Limited skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show poor ability to collect data from various sources, to systematize, analyze and evaluate them appropriately. Poor presentational skills.
Fail	Demonstrate poor or no knowledge and skills required for accomplishing the goals and expected learning outcomes of the course. Demonstrate very poor or no understanding of the subject. Show no ability to combine and/or to apply theories, principles, and methods taught in the course. Poor or no skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show very poor or no ability to collect data from other sources and to systematize, analyze and evaluate them appropriately. Very poor or no presentational skills.

Textbooks	Nei M., Kumar S.: Molecular Evolution and Phylogenetics (Oxford University Press, 2000) Hall B.G.: Phylogenetic Trees Made Easy (Sinauer, 2004, 2nd ed.)
References	TBC
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3321/
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3527 Food safety and quality management (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr H Corke, Biological Sciences		
Course Aim	To provide exposure to some key management concepts used to produce safe high-quality food products that will succeed in the marketplace. To introduce students to analysis and problem-solving of realistic business situations in food safety management.		
Course Contents	- The regulatory, social and business imperative for food safety. - Basic concepts in TQM - Statistical Process Control - Quality Function Deployment - Quality management standards (ISO 9000) - Development and implementation of a Hazard Analysis Critical Control Point (HACCP) plan (within an ISO 22000 food safety management system/ supply chain approach) - Role of environmental management systems (ISO 14000) in the food industry - Intellectual Property issues in the food industry - Religious, ethical, and cultural food choices - Illustrative business case studies on food safety management will be discussed		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the historical development of government regulation of food safety - Be familiar with a set of management techniques applicable in the food industry - Be able to analyze food production problems and make recommendations for action to improve quality and safety		
Pre-requisites	Pass in BIOL2515		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 30 hours group project work and 12 hours tutorials/presentations		

Assessment Method	One 2-hour written examination (60% weighting); project and presentation (30% weighting) and continuous assessment (10% weighting)
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use quality management skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.
Textbooks	Jones, J. M.: Food Safety (Eagan Press, 1992) Mortimore, S. and Wallace, C.: HACCP: A Practical Approach (Chapman and Hall, 1994) Forsythe, S. J.: The Microbiology of Safe Food (2nd Ed., Wiley-Blackwell, 2010)
References	TBC
Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3538 Food product development (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr M F Wang, Biological Sciences		
Course Aim	To introduce the key concepts and techniques used in food product development. To provide small group experience in the design, development and production of a new food product.		
Course Contents	History and future of the food industry; industrial product development process; idea generation and prototype development for new food products; quality management and legal protection; marketing strategies; food labeling; food package design; new product development for different food industries.		
Learning Outcomes	On successful completion of this course, students should be able to: -understand the food product development cycle -know the key steps in new product development -demonstrate enhanced insight and understanding of current and future trends in the food industry -have professional level practical experience in new product development -know the main characteristics of different sectors of the food industry		
Pre-requisites	Pass in BIOL2501 or BIOL2535		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	20 lectures, about 60-80 hours group project work		
Assessment Method	One 1-hour written test held in class (20% weighting) plus assessment of group product development project (80% weighting) including in-class presentation		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills. B: Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness. Fail: Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.		
Textbooks	A. L. Brody and J. B. Lord: Developing New Food Products for a Changing Marketplace (CRC Press, 2007) E. Graf and I. S. Saguy: Food Product Development (Avi Books, 1991) G. W. Fuller: New Food Product Development (CRC Press, 2005)		
References	TBC		

Remarks	The course will be offered subject to a minimum enrollment number.

BIOL3540 Diet, brain function and behaviour (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr E T S Li, Biological Sciences		
Course Aim	To highlight the impact of nutrient provision on brain structure and function, and to discuss various effects of nutrition and diet on mental function and behaviour.		
Course Contents	Fundamentals of the central nervous system; Nutrition & brain development; Diet, learning & memory function; Dietary CNS stimulants; Neurotransmitters, drugs & behaviour; Physiological and socio-cultural determinants of dietary behaviour.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic structure and functions of the brain and how nutrition influences its development - Be able to explain the consequences of nutrient inadequacy on cognition - Understand the differences between bioactive food ingredients and drugs - Be able to critically evaluate and interpret the internal and external cues that determine dietary behaviour		
Pre-requisites	Pass in BIOL1514 and BIOL2533		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	24 hours of lectures, 12 hours of tutorials/group discussions/seminars		
Assessment Method	One 2-hour written examination (70% weighting) and continuous assessment (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: B: C: D: Fail:		
Textbooks	Copper J. R., Bloom F. E. & Roth R. H.: The Biochemical Basis of Neuropharmacology (Oxford University Press, 2003) Lieberman H. R., Kanarek R. B. & Prasad C.: Nutritional Neuroscience (CRC Press, 2005) Nutritional Neuroscience (Journal) Physiology and Behavior (Journal)		
References	TBC		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL3621 Fisheries and mariculture (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Prof Y J Sadovy, Biological Sciences		
Course Aim	Theoretical and practical aspects of marine fisheries and mariculture will be covered to provide an understanding of the condition of global regional and local fishery resources as well as the importance of biological and ecological studies to their management. The role of mariculture in global fish supply will be examined and local fishery and mariculture examples provided.		
Course Contents	Fisheries and fishery theory; how do fisheries work? Status of the world's capture fisheries; stock assessment and enhancement; illustrative case studies; fishery management practices; Hong Kong's fishery and management; mariculture-problems and prospects; special topics in fisheries and mariculture; fisheries and conservation.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand of the functioning of fisheries and standards of assessment and development. - appreciate of the mutual dependency of humans and fished populations in relation to their long-term sustainability. - Develop the ability for critical and synthetic thinking.		
Pre-requisites	Pass in BIOL2607 or ENVS1002 or BIOL0126		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 36 hours of project work, student-centred learning, practicals and field visit		
Assessment Method	One 2-hour written exam (60% weighting) and assessment of project work (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.		

	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Hart P. J. B. & Reynolds J. D. (eds): Handbook of Fish Biology and Fisheries (Volumes 1 & 2, Blackwell Science Ltd, 2002) A list of reading material will be provided during the course.	
References	Will be provided during the course.	
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3621/	
Remarks	The course will be offered subject to a minimum enrollment number.	

BIOL3622 Ecological impact assessment (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Prof R S S Wu, Biological Sciences		
Course Aim	The basic aim of this course is to introduce students to the principles, practices and problems of Ecological Impact Assessment (EcoIA).		
Course Contents	The course will start with the basic principles of environmental impact assessment (EIA) and EIA systems in selected countries and Hong Kong. Then, the principles, methodologies and problems of EcoIA will be introduced. Finally, ecological mitigation and monitoring in EIA projects will be covered. Case studies in the form of problem-based learning exercises and practical work will compliment lectures especially on methodologies and practical problems of EcoIA in Hong Kong.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the operation of the EIA systems in Hong Kong and other developed countries. - Explain the legal requirements for EIA and EcoIA in Hong Kong, as laid out in the Environmental Impact Assessment Ordinance and the Technical Memorandum. - Understand the methodologies of EcoIA. - Plan an EcoIA study. - Write an EcoIA report for a small project.		
Pre-requisites	Pass in BIOL0605 or BIOL0600 or ENVS1002		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures, 10 hours tutorials, 15 hours field trip, 5 hours group work/project and 70 hours reading/self study		
Assessment Method	One 2-hour written examination (50% weighting) and assessment of coursework (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.	
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.	
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.	
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.	
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.	
Textbooks	J. Glasson, R. Therivel & A. Chadwick: Introduction to Environmental Impact Assessment, (London: Routledge, 2005) HKSAR Government: Technical Memorandum for Environmental Impact Assessment Ordinance (Hong Kong: HKSAR Government, 1998)		
References	To be provided in classes		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3622/		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL3626 Conservation in practice (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Professor Y Sadovy, Biological Sciences		
Course Aim	To build on the foundation acquired by students in the course "Conservation Ecology" by applying the principles and concepts learned to specific case studies and issues in conservation science. Both local and international examples will be used and assignments will address the social, economic, and political dimensions of achieving successful conservation outcomes, in addition to biological considerations.		
Course Contents	This 6-credit course will address the realities and application of conservation science in the modern world within the wider context of economic development, political considerations, scientific uncertainties, climate change, risk management and diverse cultural issues. It will address the practice relating to the conservation of threatened organisms and their habitats. Special topics to be covered will include the demography of small and fragmented populations, global and local conservation problems, assessment of conservation risk, international conservation and biodiversity instruments (such as CITES - the Convention on International Trade in Endangered Species, and CBD - Convention on Biological Diversity), impacts of conservation projects on indigenous peoples, and actual case histories of conservation of endangered animals and plants, both successful and failed. The course will also examine the historical and current trends relating to species endangerment and extinction and the value of diversity to Society. The interdisciplinary nature of conservation in practice is recognized along with the role of wider Society, beyond academic institutions, such as non-governmental organisations (NGOs).		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the complexities of conserving biodiversity in the modern world - understand the importance of conserving biodiversity from both moral and practical perspectives - be aware of the majore initiatives and measures globally addressing biodiversity issues - know of major conservation issues in Hong Kong and the SE Asian region - be aware of major factors leading to success or failure in maintaining global biodiversity		
Pre-requisites	BIOL2612 Conservation ecology		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	20 hours of lectures plus project work		
Assessment Method	One 2-hr written exam (60% weighting) & continuous assessment (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A B C D Fail		
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3626/		
Remarks	The course will be offered subject to a minimum enrollment number.		

BIOL3988 Biological sciences internship (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	---
Course Co-ordinator	Dr T Vengatesen, Biological Sciences		
Course Aim	This course aims to offer students the opportunities to gain work experience in the field of biological sciences that are related to the major(s) of study.		
Course Contents	Students taking this course will work as an intern for at least 160 hours within the University or outside the University in a company, government department or NGO. The internship may be arranged by the School or obtained by students themselves. In the latter case, the internship must be in a relevant field to the biological sciences major(s) that the students are taking and prior approval by the course coordinator is required.		
Learning Outcomes	On successful completion of this course, students should be able to: - Gain first hand work experience in a job placement related to their biological sciences major(s). - Apply the knowledge in their biological sciences major(s) in solving practical problems in the work place. - Acquire an understanding and appreciation of the real work environment. - Extend their network in their field of study.		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching. It is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Students taking this course have to submit a two-page written report and an oral presentation about their internships, which will be assessed by internal supervisors. Student's supervisor at work i.e. the institution offering the internship will also submit an assessment report to the University.		
Course Grade	Pass/Fail		
Grade Descriptors			

	Pass	Evidence of the application of professional knowledge to solve problems in the workplace. Evidence of successfulcompletion of tasks required in the job or assigned by supervisor(s). Evidence of effective collaboration and communication with supervisor (s), colleagues, and clients in the job. Satisfactory evaluation results from internal and external (if applicable) supervisor(s). Successfully fulfills all requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc.
	Fail	Very limited or no evidence of the application of professional knowledge to solve problems in the workplace. Very limited or no evidence of successful completion of tasks required in the job or assigned by supervisor(s). Very limited or no evidence of effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Unsatisfactory evaluation results from internal and external (if applicable) supervisor(s). Fail to fulfill any requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc.
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol3988/	
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.	

ENVS1002 Environmental life science (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
Course Co-ordinator	Dr T Vengatesen, Biological Sciences		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand: Life, Environment and their interactions - Appreciate: Species and ecosystem responses to human-induced environmental change - Attain: Ability to critically think and discuss about current environ-life science issues - Be motivated and equipped: to tackle biological environmental science questions and to choose advanced environmental science courses.		
Pre-requisites	Nil		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 8 hours tutorial; 3 hours group work/project and 3 to 12 hours field work		
Assessment Method	One 2-hour written examination (70% weighting), continuous assessment (10% weighting), test (10% weighting) and group presentation (10% weighting)		
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.	
References	TBC		
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs1002/		
Remarks	The course will be offered subject to a minimum enrollment number.		

ENVS2003 Demographic principles in ecology and evolution (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr D L Thomson, Biological Sciences		
Course Aim	Demography determines the interplay between wildlife populations and environments. This course explains how populations increase, decrease, stabilize, destabilize or die out. It explains how life histories themselves adapt, and emphasizes the common demographic principles in both population dynamics and evolutionary change. This introductory course is part of the major in Environmental Science, but will be of value and interest to science and non-science students generally, complementing courses in Ecology & Biodiversity particularly well .		
Course Contents	This course is taught principally as lectures, supported by problem-based learning with exercises, essays, discussions and presentations. The course is an introductory course which starts with an emphasis on the simpler demographic models characteristic of constant conditions. We explore the processes of mortality and reproduction, bringing these together to see how populations grow and shrink. We look at what makes populations stable or unstable and what makes them vulnerable to extinction. We show how the very same principles which determine the spread of populations through environments also determine the spread of genes through populations and how this in turn shapes the evolution of demography itself. We show how the relationship between environments and populations should be thought of not just in terms of causes and effects but in terms of conditions and dynamic responses.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the demographic principles of how birth and death translate into population change - Outline the demographic processes which shape the evolution of life-history decisions - Apply demographic thinking to problems in wildlife population management		
Pre-requisites	Pass in ENVS0001 or BIOL0126 or ENVS1002 or BIOL0625 or BIOL0604 or STAT1301 or MATH1111 or BIOL0605 or ECON1001		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	Up to 55 hours in total, including 12 hours of lectures, and 24 hours of problem-based learning with exercises, presentations and group discussion		
Assessment Method	One 2-hour final class test (60% weighting), ongoing exercises (20%), essays (20%)		
Course Grade	A+ to F		
Grade Descriptors	A: Evidence not only of a thorough and accurate grasp of the material as explained in the course, but of the ability to interpret, synthesise, evaluate, analyse, explain and illustrate this material, both critically and originally, applying it effectively to novel situations in order to solve even abstract and unfamiliar problems. B: Evidence of an extensive and predominantly accurate grasp of the material as explained in the course. Evidence of the ability to analyse, explain and illustrate this material effectively, though not necessarily in highly original ways. Demonstrated ability to solve problems effectively using the principles explained in the course. C: Demonstrated grasp of the main principles as covered in the course, and the ability to explain and illustrate these through recall of the argumentation and illustrations provided. Evidence of some ability to solve problems adequately through application of the principles covered in the course. D: Evidence of basic recall of some key ideas, and of the logic behind these. Some evidence of rudimentary problem-solving abilities using ideas developed in the course. Fail: Evidence of only limited recall of some basic course material. Evidence of only limited ability to tackle problems using the principles covered in the course.		
Textbooks	Rockwood 2006. Introduction to Population Ecology. Wiley-Blackwell. ISBN 978-1-405-3263-3		
References	Roff 2002 Life History Evolution. Sinauer Associates ISBN-10:0878937560 or ISBN-13-978-0878937561 Preston, Heuviline & Guillot 2001. Demography - Measuring and Modeling Population Processes. Blackwell, Oxford. ISBN 1-55786-214-1 or ISBN 1-55786-451-9 Keyfitz & Caswell Applied Mathematical Demography, Springer		
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs2003		

ENVS2009 Remediation (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr J D Gu, Biological Sciences		
Course Aim	To introduce students with the environmental fate information of different pollutants/contaminants in the environment To understand the technologies available for environmental remediation of pollutants in soils and water, and the characteristics of each techniques relevant to the pollutants of concern To learn the fundamental physical, chemical and biochemical reactions involved in the remediation process To obtain skills for critical analysis of the recent technological development and the proposed applications		
Course Contents	Understanding the types of different pollutants and their fate in the environments including both terrestrial and aquatic; and relevant strategy of pollution control and treatment; advanced oxidation, microbiological treatment and phytoremediation; mechanisms of biochemical transformation of polyaromatic hydrocarbon, polychlorinated biphenols, agrichemicals and phthalate esters as well as both metals and metalloids; biochemical pathways and the specific genes involved in detoxification; chemotaxis and engineering the degradation pathways in bacteria; transport of microorganisms and monitoring in subsurface environment; survival of introduced organisms; evolution of the degradative genes in bacteria; in situ and ex situ remediation techniques; green technologies.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the remediation technologies available to the type of pollutants of concern in remediation practice		

	- Propose remediation strategies for polluted sites with the best technologies available considering the type of pollutants and the cost involved - Differentiate the technologies available for the specific pollutants and the fundamental process involved in terms of the catalysts and the effectiveness - Describe several key chemical and biochemical processes used in environmental remediation with adequate background information on their history and development
Pre-requisites	Pass in ENVS0001; and Pass in BIOL2606 or ENVS2008, or already enrolled in either course.
Offer in 2012 - 2013	Not offered **Examination** To be confirmed
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures; 36 hours of laboratory and/or case review
Assessment Method	One 2-hour written examination (50% weighting) and student-based assessment (50% weighting). Student-based assessment includes laboratory report, review report, group project, presentations or other forms.
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
A	Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills
B	Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
C	General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
D	Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
Fail	Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

Textbooks	C.J. Hurst: Manual of Environmental Microbiology (ASM Press, 2nd edition) S.C. McCutcheon and J.L. Schnoor: Phytoremediation: Transformation and Control of Contaminants (Wiley)
References	R. Mitchell & J-D Gu: Environmental Microbiology (Wiley-Blackwell, 2nd edition)
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs2009/

ENVS2012 Global change ecology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	50
Course Co-ordinator	Dr C Dingle, Biological Sciences		
Course Aim	To introduce students to the ways in which environmental change affects biodiversity from organisms to ecosystems. This course will explore the contributions that human population growth and globalization have made to increases in greenhouse gases and associated climate change, biological invasions, land degradation, disease, and, ultimately, impacts on biological systems.		
Course Contents	Environmental change is a natural phenomenon, with ecosystems continually shifting, rearranging, emerging, and disappearing through geologic time with changes in climatic conditions. The activities of humans have added to this natural variation, increasing the magnitude and speed with which environmental change occurs. This course will focus principally on the effects of climate change on organisms and ecosystems but will also investigate other topics registering on a global scale including land use change, biological invasions, and eutrophication. We will explore (1) what climate change is and how it is manifested including climate warming, sea level rise, and ocean acidification; (2) types and extents of land use change; (3) how globalization has contributed to the spread of alien species and disease; and (4) increases in eutrophication of aquatic ecosystems with a focus on marine "dead zones". The course will investigate how these human-caused stressors affect the morphology, phenology, distributions, and evolution of organisms and their impacts on ecosystem functioning and biodiversity in freshwater, marine, and terrestrial ecosystems.		
Learning Outcomes	On successful completion of the course, students should be able to : - develop a basic understanding of what climate change and other human-associated impacts, such as land use change, are and how they are manifested on a global scale. - explain the ways that global change affects organisms' traits and distributions, and biodiversity at the ecosystem level. - understand the differences between climate change on a geologic time scale and recent climate change. - be aware of the relationships between humans and global change.		
Pre-requisites	Pass in ENVS1002		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 12 hours of tutorials, and 20 hours problem-based learning		
Assessment Method	One 2-hour written examination (50% weighting); problem-based exercises (25% weighting); continuous assessment (25% weighting)		
Course Grade	A+ to F		

Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Lovejoy, T.E. and Hannah, L. 2005. Climate Change and Biodiversity. Yale University Press, New Haven, CT, USA.
References	Araujo, M.B., and Rahbek, C. 2006. How does climate change affect biodiversity? Science 313:1396-1397. Grimm, N.B., Faeth, S.H., Golubiewski, N.E., Redman, C.L., Wu J., Bai, X., and Briggs, J.M. 2008. Global change and the ecology of cities. Science 319:756-760. Schlesinger, W.H. 2006. Global change ecology. Trends in Ecology and Evolution 21:348-351.
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs2012/

ENVS3013 Ecological demography in changing environments (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr D L Thomson, Biological Sciences		
Course Aim	By using integrated population models, biodemographers can diagnose environmental problems and understand how wildlife populations respond and adapt under changing conditions. This course will look not just at fluctuations in population size, but at how rates of mortality and fertility change and adapt giving rise to dynamic processes. This advanced course is part of the Environmental Science major, but will be of value to a wide range of students, fitting particularly well with courses in Ecology & Biodiversity.		
Course Contents	This course is taught principally as lectures, supported by problem-based learning with exercises, essays, discussions and presentations. We explore what happens to mortality rates and fertility rates in different parts of the life-cycle and in different sections of the population when conditions change while uncovering what happens as the population responds initially and as the life-history itself adapts to the environmental change. This course introduces modern methods of demographic analysis and shows how to diagnose environmental problems from an understanding of dynamic biodemographic processes. We explore not just trends or changes in environmental conditions but emphasize the importance of unpredictable variability and how this has subtle and important effects on population dynamics and on the evolution of life-histories.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain how dynamic population and evolutionary processes arise from both environmental change and the demographic properties of wildlife populations - Outline the demographic principles of how wildlife populations will respond and adapt to environmental change - Tackle environmental issues using demographic approaches, explaining the principles of how to diagnose and solve problems		
Pre-requisites	Pass in BIOL1608, BIOL2608 or BIOL2610 or BIOL2611 or BIOL2612 or BIOL2615 or BIOL2617 or BIOL2619 or ENVS2003 or STAT2301 or STAT2801 or ECON2101		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	Up to 55 hours in total, including 12 hours of lectures, and 24 hours of problem-based learning with exercises, presentations and group discussion		
Assessment Method	One 2-hour written examination (60% weighting), ongoing exercises (20%) and essays (20%)		
Course Grade	A+ to F		
Grade Descriptors	A: Evidence not only of a thorough and accurate grasp of the material as explained in the course, but of the ability to interpret, synthesise, evaluate, analyse, explain and illustrate this material, both critically and originally, applying it effectively to novel situations in order to solve even abstract and unfamiliar problems. B: Evidence of an extensive and predominantly accurate grasp of the material as explained in the course. Evidence of the ability to analyse, explain and illustrate this material effectively, though not necessarily in highly original ways. Demonstrated ability to solve problems effectively using the principles explained in the course. C: Demonstrated grasp of the main principles as covered in the course, and the ability to explain and illustrate these through recall of the argumentation and illustrations provided. Evidence of some ability to solve problems adequately through application of the principles covered in the course. D: Evidence of basic recall of some key ideas, and of the logic behind these. Some evidence of rudimentary problem-solving abilities using ideas developed in the course. Fail: Evidence of only limited recall of some basic course material. Evidence of only limited ability to tackle problems using the principles covered in the course.		
Textbooks	Rockwood 2006 Introduction to Population Ecology. Wiley-Blackwell. ISBN 978-1-4051-3263-3 Roff 2002 Life History Evolution. Sinauer Associates. ISBN-10:0878937560 or ISBN-13:978-0878937561		

References	Lande, Engen & Saether Stochastic Population Dynamics in Ecology and Conservation. Oxford University Press
Course Website	http://www.biosch.hku/ecology/lsc/envs3013
Remarks	Candidates are encouraged to be enrolled in or to have passed ENVS2003.

ENVS3014 Environmental risk assessment and management (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	---
Course Co-ordinator	Dr K M Y Leung, Biological Sciences		
Course Aim	This course will introduce how we can assess & manage environmental risks (ER) with an emphasis on those that associated with anthropogenic activities. Environmental risk assessments (ERAs) are useful scientific tools for determining the likelihood that human activities such as contaminant releases, pose an unacceptable risk to human health or the environment of concern. Currently, ERAs are required under various regulations in many developed countries to enable objective assessment & characterization of the ER, support decision-making and risk management & promote effective communications.		
Course Contents	This course will address the theory and practice of human and ecological risk assessments with real case studies. Students completing the course will gain a sound knowledge of the concepts and principles of ERAs, risk management and risk communication as applied in practice. Students can expect to become familiar with the basic risk assessment tools such as the prospective, retrospective and tiered ERA approaches, as well as the risk-benefit analysis. Students will be able to select and apply these tools to tackle risk issues; and appreciate the interpretation of environmental risks and the role of ERAs in environmental policy formulation and decision making.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the basic principles, concepts and practices of environmental risk assessment (ERA); - Characterize environmental risk using the hazard quotient approach and Monte Carlo simulation; - Identify the major uncertainties in ERA processes; and - Communicate environmental risk effectively at various levels.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or BIOL2614 or CHEM2102 or ENVS2008 or ENVS2009		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	Up to 55 hours of lectures, tutorials, exercises, presentations and group discussion		
Assessment Method	One 2-hour written examination (60% weighting), ongoing exercises (30%) and essays (10%)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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 skills and techniques for conducting environmental risk assessments. Be able to critically use information, data and 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 skills and techniques for conducting environmental risk assessments. Be able to correctly use information, data and 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 skills and techniques for conducting environmental risk assessments. Demonstrate mostly correct but some erroneous use of information, data and 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 skills and techniques required for basic environmental risk assessments. Demonstrate limited ability to use information, data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
Fail	Demonstrate evidence of little or no grasp of the 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 skills and techniques required for basic environmental risk assessments. Demonstrate misuse of information, data and results and/or unable to draw appropriate conclusions. Apply minimally effective or ineffective organizational and presentational skills

Textbooks	TBC
References	To be confirmed
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs3014/
Remarks	Offered from 2011-2012. Taking both BIOL3622 & ENVS3014 is preferred.

ENVS3016 Environmental science in practice (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	18
Course Co-ordinator	Dr M Yasuhara, Biological Sciences		
Course Aim	To provide students experiential learning experience in the field of environmental science. The course is primarily based on an array of relevant field studies covering four essential areas as shown below. Invited guest lectures delivered by environmental practitioners may be held.		
Course Contents	Students to attend a series of field trips in, or outside, Hong Kong throughout the final academic year. The field trips may include:		

	(1) Environmental science and technologies: visiting water treatment plant, waste water treatment plant, strategic landfill sites, power plants, Environmental Management Division of Productivity Council (for research and development of green technology), Centre for Marine Environmental Research and Innovative Technology; (2) Environmental management: visiting Environmental Protection Department, selected green groups (e.g. Green Power, the Nature Conservancy, Friends of the Earth, WWF-HK and Green Council), Business Environment Council, and selected waste management companies; (3) Natural resource management and conservation: visiting Agriculture, Fisheries and Conservation Department, Fish Marketing Organization, local fisheries organizations, agriculture/aquaculture/mariculture farms, Mai Po RAMSAR Site, Hong Kong Wetland Park, Hong Kong Organic Resource Centre, Country Park Visitor Centre, and Marine Parks and Reserves; (4) Urban planning and sustainable development: visiting Kadoorie Institute in Shek Kong, Planning Department, selected sites for field studies on land use problems, natural hazards, and solutions, and selected commercial firms for carbon auditing and insurance solutions.
Learning Outcomes	On successful completion of this course, students should be able to: - recognize ways of environmental science in practice, - gain knowledge of current environmental problems and solutions, and - present and communicate their field observations and findings.
Pre-requisites	Satisfactorily completed second year of study in the Environmental Science major
Offer in 2012 - 2013	Year long — **Examination**: No Exam
Offer in 2013 - 2014	Y
Teaching Hours	Students will take part in at least 48 hours of field trips and 18 hours of guided discussions. Some trips will be organized in the summer vacation and reading weeks, and others in weekends.
Assessment Method	Field reports (30% weighting), group presentation (30% weighting) and individual report (40% weighting)
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
A	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective lab / fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
B	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
C	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

Course Website	http://www.biosch.hku.hk/ecology/lsc/envs3016/
Remarks	Offered from 2011-2012. Satisfactorily completed second year of study in the Environmental Science major.

ENVS3988 Environmental science internship (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	30
Course Co-ordinator	Dr C Dingle, Biological Sciences		
Course Aim	To offer students the opportunities to gain work experience in applying knowledge and skills gained in the study of the major to the real work environment.		
Course Contents	Students will be supervised by a staff member (the Internal Supervisor) within the University of Hong Kong as instructed by the Internal Supervisor. In the case of the work being carried out in an external agency, students will be supervised by a staff member of the external agency (the External Supervisor) and a staff member of the University (the Internal Supervisor). The work to be performed by students will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - gain at least 4 weeks of work experience environmental-related firm or the Government - acquire an understanding and appreciation of the real work environment - have some experience with applying learned knowledge to solving real world problems		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal lecture is to be given, but it is expected that students are to work for at least 160 hours (lunch hour excluded) in at least 20 working days, supervised by a staff member.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give a presentation on their internship experience. Supervisors are required to assess the students based on their performance during the internship period (in the case of internships outside the university, the Internal Supervisor will assess the student based on the feedback by the External Supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors			

Grade	Descriptor
	Demonstrate ability of applying knowledge tosolve problems in the workplace. Successfully handle and carry out the work

	Pass	required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job.Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s).
	Fail	Demonstrate very limited or no ability of applying knowledge tosolve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job.Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s).
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs3988/	
Remarks	Students are expected to have satisfactorily completed their Year 2 study. In exceptional circumstance, special consideration may be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.	

CAES1801 Academic English for Science Students (3 credits)		Academic Year	2012
Offering Department	English	Quota	---
Course Co-ordinator	Mr P D Desloge, English		
Course Aim	To build confidence in the use of English for writing and speaking about science.		
Course Contents	The focus is on: (1) writing an essay which meets the requirements of good academic writing, in particular making appropriate use of published sources and avoiding plagiarism; (2) speaking in an organised and coherent manner.		
Learning Outcomes	On successful completion of this course, students should be able to: - Write an essay which adheres to the conventions of academic writing and demonstrates effective use of English. - Understand and apply the conventions of referencing in relation to the use of sources. - Make an academic presentation while speaking in an organised and coherent way.		
Pre-requisites	Not for students who have passed in ECEN1801 before.		
Offer in 2012 - 2013	1st sem	Examination	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	One 2-hours class per week for 12 weeks		
Assessment Method	One examination (30%) and continuous assessment (70%)		
Course Grade	A+ to F		
Grade Descriptors	(see below)		

Grade Descriptors

A	Excellent result. Wholly appropriate productive skills displaying a complete awareness of audience, purpose and structure in disciplinary work. Students demonstrate an ability to fully comprehend and critically interpret spoken and written texts. Students are able to successfully evaluate their language performance in all areas. 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. Mostly appropriate productive skills displaying good awareness of audience, purpose and structure, although there are occasional lapses in areas such as tone. Students can comprehend and interpret texts with ease, although they may miss sophisticated inferences. Students are able to successfully evaluate their language performance in most areas. 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. Productive skills are often inappropriate for a disciplinary audience, although there is an overall sense that the work is communicating to an academic audience. Purposes may be unclear and tone is often unsuitable. Students have some difficulty comprehending and critically interpreting texts, sometimes failing to understand the main ideas and writers' views and attitudes. Students are able to successfully evaluate their language performance in a limited number of areas. Written language is often inaccurate, although errors when they occur are more often in complex grammar and vocabulary. Spoken language is generally comprehensible and fluent but at times places strain on the listener.
D	Barely satisfactory result. Productive skills are mostly inappropriate for a disciplinary audience. The purposes are not clear or made explicit and the tone is often problematic. Students have real difficulty comprehending and interpreting texts, often failing to understand the main ideas and writers' views and attitudes. Students are rarely able to evaluate their language performance. Written language is often inaccurate containing frequent errors in simple and complex grammar and vocabulary. Spoken language is sometimes comprehensible and fluent, but strain is frequently placed on the listener.
Fail	Unsatisfactory result. Productive skills are too limited to be able to successfully carry out tasks. Students are unable to follow and interpret texts. There are language errors in almost every sentence. Assessments may not have been attempted or contain plagiarism.

Textbooks	NIL
References	NIL
Course Website	Caes.hku.hk/science/year1
Remarks	This course is compulsory for all B.Sc. students. The code of this course has been changed to CAES1801 from ECEN1801 with effect from the academic year 2010-2011.

CAES2802 Advanced English for Science Students (3 credits)		Academic Year	2012
Offering Department	English	**Quota**	---
Course Co-ordinator	Mr P D Desloge, English		
Course Aim	To develop a sense of audience awareness in writing, to develop spontaneous speaking skills and to individualise language learning.		
Course Contents	The focus is on: (1) Writing a short article for one of a range of web journals each with a different audience and topic focus (individual choice); (2) Spontaneous (i.e. unrehearsed) discussion through participation in speaking workshops and one-to-one discussions; (3) Developing independent language learning skills to help students address their individual language problems and focus on their future language needs.		
Learning Outcomes	On successful completion of this course, students should be able to: - Discuss science and non-science topics spontaneously while demonstrating accuracy of grammar, pronunciation, clarity, comprehensibility and relevance to topic. - Identify their own language learning needs and develop a plan to meet those needs. - Identify and make use of the key characteristics of writing for a specific target audience, e.g. age, cultural background, geographical location and subject knowledge.		
Pre-requisites	Pass in ECEN1801/CAES1801		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	One 2-hours class per week for 12 weeks		
Assessment Method	One examination (30%) and continuous assessment (70%)		
Course Grade	A+ to F		
Grade Descriptors	A: Excellent result. Wholly appropriate productive skills displaying a complete awareness of audience, purpose and structure in disciplinary work. Students demonstrate an ability to fully comprehend and critically interpret spoken and written texts. Students are able to successfully evaluate their language performance in all areas. 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. Mostly appropriate productive skills displaying good awareness of audience, purpose and structure, although there are occasional lapses in areas such as tone. Students can comprehend and interpret texts with ease, although they may miss sophisticated inferences. Students are able to successfully evaluate their language performance in most areas. 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. Productive skills are often inappropriate for a disciplinary audience, although there is an overall sense that the work is communicating to an academic audience. Purposes may be unclear and tone is often unsuitable. Students have some difficulty comprehending and critically interpreting texts, sometimes failing to understand the main ideas and writers' views and attitudes. Students are able to successfully evaluate their language performance in a limited number of areas. Written language is often inaccurate, although errors when they occur are more often in complex grammar and vocabulary. Spoken language is generally comprehensible and fluent but at times places strain on the listener. D: Barely satisfactory result. Productive skills are mostly inappropriate for a disciplinary audience. The purposes are not clear or made explicit and the tone is often problematic. Students have real difficulty comprehending and interpreting texts, often failing to understand the main ideas and writers' views and attitudes. Students are rarely able to evaluate their language performance. Written language is often inaccurate containing frequent errors in simple and complex grammar and vocabulary. Spoken language is sometimes comprehensible and fluent, but strain is frequently placed on the listener. Fail: Unsatisfactory result. Productive skills are too limited to be able to successfully carry out tasks. Students are unable to follow and interpret texts. There are language errors in almost every sentence. Assessments may not have been attempted or contain plagiarism.		
Textbooks	NIL		
References	NIL		
Course Website	Caes.hku.hk/science/year2		
Remarks	This course is compulsory for all B.Sc. students. The code of this course has been changed to CAES2802 from ECEN2802 with effect from the academic year 2010-2011.		

CHEM0003 Chemistry and daily life (3 credits)		Academic Year	2012
Offering Department	Chemistry	Quota	200
Course Co-ordinator	Prof W K Chan, Chemistry		
Course Aim	This course is designed as an elective for students in all disciplines and all years without strong chemistry background. It gives an overview of some important chemical aspects that we encounter in our daily life.		
Course Contents	This course will give a brief overview on what chemists have achieved for the improvement of our daily life. The following topics will be included: the production and working principles of various consumer products such as household chemicals, personal health care products, plastics, petroleum etc.; the roles of chemistry in the development of advanced technological products such as computer, CD Roms, and integrated circuit chips; energy for the future.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the importance of chemistry to the development of modern technology, and how it affects our daily life; - identify examples of important chemicals and materials for daily and advanced technological applications		
Pre-requisites	Not for students who have passed in CHEM1002, or have already enrolled in this course; and Not for students who have passed in CHEM1003, or have already enrolled in this course; and Not for students who have already passed in CHEM1005 before; and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1009, or have already enrolled in this course; and Not for students who have passed in CHEM1401, or have already enrolled in this course; and Not for Chemistry major students.		
Offer in 2012 - 2013	Not offered	Examination	No Exam
Offer in 2013 - 2014	N		
Teaching Hours	12 hours lectures plus up to 3 hours tutorial and demonstration classes		
Assessment Method	Continuous assessment including essays, project and test (100%)		
Course Grade	A+ to F		
Grade Descriptors			
References	C. H. Snyder: The Extraordinary Chemistry of Ordinary Things (John Wiley and Sons, 1998, 3rd ed.)		

Grade Descriptors:

A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the basic foundation knowledge of inorganic and organic chemistry and their relevance to biology and materials science. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic & organic 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 & organic chemistry.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the basic foundation knowledge of inorganic and organic chemistry and their relevance to biology and materials science. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic and organic 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 and organic chemistry.
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 and organic chemistry and their relevance to biology and materials science. Show evidence of some abilities to apply and integrate knowledge and theory, and 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 and organic chemistry.
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 and organic chemistry and their relevance to biology and materials science. Show evidence of limited abilities to apply and integrate knowledge and theory, and 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 and organic chemistry.
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 and organic chemistry and their relevance to biology and materials science. 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 and erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of inorganic and organic chemistry.

CHEM0008 Fundamental chemistry (6 credits)		Academic Year	2012
Offering Department	Chemistry	Quota	---
Course Co-ordinator	Dr A P L Tong, Chemistry		
Course Aim	To provide students, who are interested in chemistry but lack the AL/AS Chemistry background or equivalent, a foundation course in general chemistry. The course aims to lay a good theoretical and practical foundation for students. It will prepare students with the necessary knowledge, study and practical skills to further explore chemistry or to complement their studies in other science disciplines.		
Course Contents	The course will include the following topics: the mole concept and stoichiometry; states of matter; chemical thermodynamics; chemical kinetics; atomic structure; the periodic table; chemical bonding & bonding theories; chemical equilibrium; acid-base equilibria; and organic chemistry: a study of the chemistry of various functional groups.		
Learning Outcomes	On successful completion of this course, students should be able to: - demonstrate knowledge and understanding in relation to some chemical vocabulary, terminology and conventions. - demonstrate knowledge and understanding in relation to selected facts, phenomena, laws, principles, theories and concepts in chemistry and their limitations. - demonstrate awareness of the relevant applications of chemistry in society and in everyday life. - identify problems for given situations, and select and apply acquired knowledge and understanding to solve problems. - organize and present chemical ideas in a clear, logical and coherent forms. - observe and record experimental observations accurately, and interpret and evaluate the experimental data.		
Pre-requisites	E or above in HKCEE Chem; and		

	Not for students with E or above in AL Chem or AS Chem.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials; 3 x 3 hours of laboratory sessions		
Assessment Method	One 2-hour written examination (60 % weighting) and continuous assessment (40 % weighting) through practical work and quizzes		
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.		
Textbooks	Theodore E Brown: Chemistry: The Central Science (Prentice Hall, latest edition)		
Remarks	Not for students who have already passed HKUSPACE Community College Chemistry I or II before. Students with AS Chem should first obtain approval from the department.		

CHEM1002 Chemistry: principles and concepts (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	200
Course Co-ordinator	Prof D L Phillips, Chemistry		
Course Aim	To provide basic knowledge of modern chemistry. This course is a pre-requisite for the advanced chemistry courses.		
Course Contents	Introduction to quantum theory, atomic and molecular structures, chemical bonding. Structures and properties of matters. Gas Laws and kinetic theory. Chemical energy, equilibrium and thermodynamics. Chemical kinetics.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the terminology and nomenclature associated with general chemistry topics discussed in the course - Demonstrate knowledge and understanding of basic concepts in quantum theory, atomic and molecular structures, chemical bonding, thermodynamics and chemical kinetics - Understand the relationships between atomic and molecular structures to chemical bonding - Understand the relationships between the laws of thermodynamics and transformations of energy in chemistry and the physical forms of matter		
Pre-requisites	(E or above in AL or AS Chem; or Pass in CHEM0008); and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1009, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (75% weighting) and continuous assessment (25% weighting)		
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.
Textbooks	Thomas Engel: Physical Chemistry (Pearson, latest version) P. W. Atkins: Physical Chemistry (Oxford University Press, latest version)	
Remarks	Suggested follow-up courses: CHEM2503, CHEM2510	

CHEM1003 Chemistry: the molecular world (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	230
Course Co-ordinator	Prof V W W Yam, Chemistry		
Course Aim	To provide students with the basic principles and knowledge of inorganic and organic chemistry and to introduce their relevance to biological processes and materials science. This course provides the foundation for further studies in both inorganic and organic chemistry.		
Course Contents	Acid-base concept; structure and bonding of inorganic and organic compounds; electronic absorption and magnetic properties of metal complexes; chemical reactions of metal complexes: redox and substitution; metal complexes in biology and materials; three-dimensional structure of organic molecules; conformational stereochemistry; chirality, chemistry of selected classes of organic compounds including alkanes, alkenes, and haloalkanes.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic principles and concepts of inorganic and organic chemistry and appreciate their relevance to selected examples of biological processes and materials science - Demonstrate knowledge and understanding of the acid-base concept and definition; the structure and bonding of main group molecules and metal complexes and their relevance to the electronic absorption and magnetic properties of metal complexes - Demonstrate knowledge and understanding of the thermodynamic stability of metal complex formation and the thermodynamic and kinetic aspects of substitution and redox reactions; the role of metal complexes in bioinorganic chemistry - Visualize and represent/draw three-dimensional, stereochemically correct representations of organic molecules - Recognize, discriminate, and name chiral stereoisomers - Apply reactions to the synthesis of target molecules		
Pre-requisites	(E or above in AL or AS Chem; or Pass in CHEM0008); and Not for students who have already passed in CHEM1406 before; and Not for students who have passed in CHEM1401, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (75% weighting) and continuous assessment (25% weighting)		
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 and organic chemistry, especially those related to acid-base concept; structure and bonding of organic molecules, main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; conformational stereochemistry; chirality; chemistry of alkanes, alkenes and haloalkanes; 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 and organic 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 and organic chemistry.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic and organic chemistry, especially those related to acid-base concept; structure and bonding of organic molecules, main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; conformational stereochemistry; chirality; chemistry of alkanes, alkenes and haloalkanes; 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 and organic 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 and organic chemistry.
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 and organic chemistry, especially those related to acid-base concept; structure and bonding of organic molecules, main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; conformational stereochemistry; chirality; chemistry of alkanes, alkenes and haloalkanes; 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 and organic 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 and organic chemistry.
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 and organic chemistry, especially those related to acid-base concept; structure and bonding of organic molecules, main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; conformational stereochemistry; chirality; chemistry of alkanes, alkenes and haloalkanes; 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 and organic 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 and organic chemistry.
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 and organic chemistry, especially those related to acid-base concept; structure and bonding of organic molecules, main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; conformational stereochemistry; chirality; chemistry of alkanes, alkenes and haloalkanes; 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 and organic 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 and organic chemistry.

Textbooks	F. A. Cotton; G. Wilkinson; P. L. Gaus: Basic Inorganic Chemistry (John Wiley & Sons, 1995, 3rd ed.) D. Shriver, P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong: Inorganic Chemistry, 4th edition, Oxford University Press, 2006 J. McMurry, Organic Chemistry, 2008, 7th Edition, Brooks/Cole-Thompson J. McMurry, Study Guide and Student Solutions Manual, 7th Edition, Brooks/Cole-Thomp
Remarks	Suggested follow-up courses: CHEM2303, CHEM2403, CHEM2109

CHEM1004 Chemistry: an experimental science I (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Dr A P L Tong, Chemistry		
Course Aim	To provide students with intensive hands-on training of basic experimental chemistry techniques, and also the opportunity to develop observational and critical thinking skills that are essential for carrying out experiments or scientific investigations. The course covers principles & applications of chemical laboratory skills & techniques: standardization and calibration; volumetric analysis; preparation, purification, and characterization of chemical substances; ultraviolet-visible spectrophotometry; infrared spectroscopy; gas & liquid chromatography; statistical data treatment & evaluation.		
Course Contents	The course will include the following topics: laboratory safety practice; general laboratory procedures; standardization and calibration; errors in chemical analyses; statistical data treatment and evaluation; preparation, purification, and characterization of chemical substances; ultraviolet-visible spectrophotometry; infrared spectroscopy; gas and liquid chromatography; thermodynamic measurement; kinetic measurement; and complexation reaction.		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate a good practice of laboratory safety - Exercise the proper procedures and regulations for safe handling and use of chemicals - Carry out, record and analyze the results of chemical experiments - Use common modern instrumentation to characterize compounds and draw conclusions from the results - Communicate the results of their work to others - Demonstrate problem-solving skills, critical thinking and analytical reasoning		
Pre-requisites	E or above in AL or AS Chem; or Pass in CHEM0008.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	N		
Teaching Hours	12 hours of lectures and demonstrations11 x 4-hour of laboratory sessions		
Assessment Method	Continuous assessment (100%)		
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. 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. 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. 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. 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. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition) John W. Lehman: Operational Organic Chemistry - A Problem-Solving Approach to the Laboratory Course (Pearson, latest edition) G. Svehla: Vogels' Qualitative Inorganic Analysis (Longman, latest edition)		

CHEM1009 Basic chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	240
Course Co-ordinator	Dr I K Chu, Chemistry		
Course Aim	This course is designed for non-chemistry major students covering basic principles of chemistry.		
Course Contents	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the principles of the thermochemistry, chemical kinetics, chemical equilibrium, physical properties of solutions and gases. - Explain the principles of the spectroscopy, and spectrometry.		
Pre-requisites	E or above in AL or AS Chem; and Not for students who have already passed in CHEM1001 before; and Not for students who have already passed in CHEM1007 before; and Not for students who have passed in CHEM1002, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures		
Assessment Method	One 2-hour written examination (75% weighting) and continuous assessment (25% weighting)		
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.		
Textbooks	Spectroscopy for the biological science, by Gordon G. Hammes, Wiley-Interscience (2005)		

CHEM1401 Fundamentals of organic chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	120
Course Co-ordinator	Dr P H Toy, Chemistry		
Course Aim	The major objective of this course is to give the students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of laboratory experiments.		
Course Contents	The chemistry of organic functional groups such as alkenes, alkynes, alkyl halides, alcohols, aldehydes, ketones, carboxylic acids and their derivatives, and amines will be discussed, as will the general concepts of molecular structure, conformation and stereochemistry.		
Learning Outcomes	On successful completion of this course, students should be able to: - have a basic understanding of the structure of organic molecules - have basic understanding of the reactivity of organic molecules - appreciate how organic chemistry plays an important role in everyday life		
Pre-requisites	(E or above in AL or AS Chem; or Pass in CHEM0004 or CHEM0008); and Not for students who have passed CHEM1003, or have enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 5 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written exam (60%), 2 mid-term tests and 5 experiments (40% total)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive organic chemistry knowledge, and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar problems. B: Demonstrate substantial command of organic chemistry with a broad range of knowledge, and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar problems. Demonstrate general but incomplete command of organic chemistry knowledge, and skills required for attaining most of the		

	C	course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems.
	D	Demonstrate partial but limited command of organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.
	Fail	Demonstrate little or no evidence of command of organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.
Textbooks	Bruice, P.Y.; Essential Organic Chemistry (Pearson, 2010, 2nd Edition)	
Remarks	Students who are planning to take CHEM2403 should take CHEM1003.	

CHEM1410 Basic chemistry principles for pharmacy students (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	30
Course Co-ordinator	Dr E L M Wong, Chemistry		
Course Aim	This course is designed to introduce basic principles of chemistry to Bachelor of Pharmacy students.		
Course Contents	Gas Laws, thermodynamics, physical properties of liquid and gases; Chemical Kinetics: rate of reactions, effect of temperature, orders of reactions, rate laws, reaction mechanism, experimental measurement of reaction rates, enzyme kinetics, enzyme inhibition; applications in pharmacokinetics Chemical Equilibrium; Acids and bases: pH values in aqueous solution, importance in biological systems, diprotic and polyprotic acids, activity; Basic Spectroscopy and Spectrometry Techniques and their applications: UV/Visible absorption spectroscopy; NMR spectroscopy; Mass Spectrometry.		
Learning Outcomes	On completion of the course, the students should be able to: - Demonstrate knowledge and understanding of basic principles of thermochemistry, chemical kinetics, chemical equilibrium, physical properties of solutions and gases that are essential to pharmaceutical sciences - Demonstrate knowledge and understanding principles and of spectroscopy and spectrometry and their applications in pharmaceutical sciences		
Pre-requisites	For BPharm students only; and E or above in AL or AS Chem; and Not for students who have passed in CHEM1009, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures		
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment and tests (25% weighting)		
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.
Textbooks	Spectroscopy for the biological science, by Gordon G. Hammes, Wiley-Interscience (2005)	

CHEM1411 Fundamentals of Organic Chemistry for Pharmacy Students (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	30
Course Co-ordinator	Dr P H Toy, Chemistry		
Course Aim	The major objective of this course is to give pharmacy students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of laboratory experiments.		
Course Contents	The chemistry of organic functional groups such as alkenes, alkynes, alkyl halides, alcohols, aldehydes, ketones, carboxylic acids and their derivatives, and amines will discussed, as will the general concepts of molecular structure, conformation and stereochemistry.		

Learning Outcomes	On successful completion of this course, students should be able to: - have a basic understanding of structure of organic molecules - have a basic understanding of the reactivity of organic molecules - have an appreciation of how organic chemistry plays an important role in everyday life		
Pre-requisites	For BPharm students only; and E or above in AL/AS Chemistry; and Not for students who have passed in CHEM1401, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 5 tutorials, 5 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (60% weighting), 2 mid-term tests and 5 experiments (40% total)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive organic chemistry knowledge, and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar problems. B: Demonstrate substantial command of organic chemistry with a broad range of knowledge, and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar problems. C: Demonstrate general but incomplete command of organic chemistry knowledge, and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems. D: Demonstrate partial but limited command of organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Fail: Demonstrate little or no evidence of command of organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.		
Textbooks	Bruice, P.Y.; Essential Organic Chemistry (Pearson, 2010, 2nd Edition)		
Remarks	This course is available to pharmacy students only.		

CHEM2003 Introductory instrumental chemical analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	This course is designed for non-chemistry major students covering basic principles of separation and spectroscopy for chemical analysis. This course provides a general foundation for further studies in pharmacology, life and environmental sciences.		
Course Contents	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic mass spectrometry; grating spectrometer; photon detectors and thermal detectors. Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumental set up of HPLC and GC. Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers. Analysis and quality assurance: statistical analysis of small sets of data, control chart.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the principles of the optical methods, separation methods, and mass spectrometry. - Describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes. - Apply experimental skills in chemical analysis including sample preparation, standard solution preparation, instrument calibration, matrix effects correction (standard additions)		
Pre-requisites	Pass in CHEM1002 or CHEM1007 or CHEM1009; and Not for students who have passed CHEM2202, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 7 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment (25% weighting)		
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.
Textbooks	D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition). D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition)	

CHEM2102 Environmental chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	This course introduces students to Environmental Chemistry and enables them to understand the chemical principles involved in various environmental phenomena and processes.		
Course Contents	Atmosphere chemistry: atmospheric composition and behavior, ozone in the stratosphere, chemistry of the troposphere, air pollution Water Chemistry: property of water, water resources and cycle, chemical quality of natural water, acid-base chemistry, oxidation-reduction chemistry, water purification Organic pollutants: persistent organic pollutants, pesticides, toxicology Energy: energy resources, fossil fuels, solar energy, nuclear energy, energy conversion (heat engine, fuel cells) Waste treatment: domestic and hazardous waste treatment (landfill, incineration, air stripping, adsorption, oxidation)		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate knowledge on chemical principles of the various environmental phenomena and processes. - Describe the practical processes of chemistry in atmosphere, water purification, waste treatment, and energy production. - Critically discuss local and global environmental issues based on scientific principles and data. - Apply knowledge to analyze chemical processes involved in various environmental problems		
Pre-requisites	Pass in CHEM1002 or CHEM1003 or CHEM1007 or CHEM1009 or CHEM1401		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 12 tutorials, plus optional 5 x 1-hour guided study		
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment (25% weighting)		
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.		
Textbooks	C. Baird and M. Cann: Environmental Chemistry, Freeman, latest edition. S.E. Manahan: Environmental Chemistry, Lewis Publishers, latest edition.		

CHEM2103 Chemical process industries and analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Prof K Y Chan, Chemistry		
Course Aim	To familiarize with typical chemical industries important in local and global economy. To understand the technology of chemicals manufacturing and chemical processes in general industry.		
Course Contents	Process flow charts, units and conversions, materials and energy balances, unit operations. Selection of chemical processes to include variation in products, scale, and types of operation, e.g. for petrochemical industries, industrial gases, beverage processes, chloroalkaline manufacturing.		
Learning Outcomes	On successful completion of this course, students should be able to: - Solve basic problems of energy and mass balances in chemical and environmental processes. - Be familiarized with a few common chemical industries and chemical processes. - Understand some general principles of industrial practice through plant visits.		

Pre-requisites	Pass in CHEM1002 or CHEM1502 or CHEM1007 or CHEM1009		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 6 tutorials. Field work: about 1-2 plant visits		
Assessment Method	One 2-hour written examination (70% weighing). Continuous assessment (30% weighing)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough knowledge of industrial chemical processes and mastery of mass and energy balance skills required for attaining all of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to solve problems in a wide range of complex, familiar and unfamiliar situations. Critical use of data and sourcing of references. Apply highly effective organizational and presentational skills. B: Demonstrate substantial knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Misuse of data and references. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	Felder and Rousseau: Elementary Principles of Chemical Processes		

CHEM2109 Introduction to materials chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Prof W K Chan, Chemistry		
Course Aim	This course provides an introduction to materials chemistry. Some basic material characterization techniques will also be introduced. This course is essential for students who wish to take advanced materials course.		
Course Contents	Classification of materials; introduction to organic polymers: molecular weight, polymerization reaction, polymer synthesis and characterization; ceramics; semiconducting materials; applications of different materials; materials characterizations.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe different materials classification and to explain the concept of structure/property relationship; - understand the concept of molecular weight distribution in polymers, and explain how it is affected by the kinetics of polymerization reactions; - identify examples of some important polymers, and explain how the molecular structure of these polymers affect their physical properties; - demonstrate knowledge in materials characterizations.		
Pre-requisites	Pass in CHEM1003 or CHEM1009 or CHEM1401		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours lecture/tutorial/discussion sessions		
Assessment Method	One 2-hour written examination (70%), continuous assessment (30%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the classification of materials, materials properties, synthesis and characterization of polymers, properties and applications of common polymers. Show strong ability to apply and integrate knowledge and theory relating to the synthesis and applications of materials. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to materials synthesis and characterization. B: Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the classification of materials, materials properties, synthesis and characterization of polymers, properties and applications of common polymers. Show evidence to apply and integrate knowledge and theory relating to the synthesis and applications of materials. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to materials synthesis and characterization. C: Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the classification of materials, materials properties, synthesis and characterization of polymers, properties and applications of common polymers. Show evidence of some abilities to apply and integrate knowledge and theory relating to the synthesis and applications of materials. 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 materials synthesis and characterization. D: Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the classification of materials, materials properties, synthesis and characterization of polymers, properties and applications of common polymers. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the synthesis and applications of materials. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to materials synthesis and characterization. Fail: Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the classification of materials, materials properties, synthesis and characterization of polymers, properties and applications of common polymers. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the synthesis and applications of materials. 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 materials synthesis and characterization.
Textbooks	F. W. Billmeyer: Textbook of Polymer Science (John Wiley and Sons, 1984) G. Odian: Principles of Polymerizations (John Wiley and Sons, 2004) M. P. Stevens: Polymer Chemistry: An Introduction (Oxford University Press, 1999)	

CHEM2111 Directed studies in chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	---
Course Co-ordinator	Prof D L Phillips, Chemistry		
Course Aim	This course is designed for second year students who would like to take an early experience on research. It offers students an opportunity to carry out small scale chemical projects by themselves.		
Course Contents	Students interested in taking this course should contact their prospective supervisors in May to determine the contents and the nature of their project in the coming academic year. Prior approval from both the prospective supervisor and the course coordinator is required.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the terminology and nomenclature associated with the small scale chemical project they worked on in the course - Demonstrate knowledge and understanding of basic concepts involved in their chemical project - Understand the relationships of the their particular chemical project to the wider area of chemistry that is related to		
Pre-requisites	Pass in CHEM1002 or CHEM1003 or CHEM1004 or CHEM1406 or CHEM2507 or CHEM2510.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Discussion and meetings to be arranged by the student and the supervisor. The student is expected to spend at least 50 hours on the project.		
Assessment Method	Assessment is by a written report and an oral examination.		
Course Grade	A+ to F		
Grade Descriptors	A: Show an extensive comprehension of the subject. Demonstrate very able analytical and critical thought with presence of some originality. Illuminating utilization and critical analysis / evaluation of information acquired from a wide range of high quality sources. Critical employment of data and results to synthesize appropriate and illuminating conclusions. Demonstrate integration of a wide range of appropriate theories, principles, data and methods. Employ very effective organizational and presentational skills. [Work of A+ should demonstrate substantial additional work beyond that is required in wider areas relevant to the topic.] B: Show a substantial comprehension of the subject. Demonstrate able analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose meaningful comparisons between different secondary interpretations. Correct utilization of data and results to form appropriate conclusions. Compose general integration of theories, principles, data and methods. Perform effective organizational and presentational skills. C: Show a general but incomplete comprehension of the subject. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills. D: Show a partial but limited comprehension, with knowledge of some relevant information, of the subject. Presence of some coherent and logical thinking, but with limited analytical and critical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective organizational and presentational skills. Fail: how little or no comprehension of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.		
References	Recommended reading material will be assigned depending on the project.		
Remarks	Exceptional academic strength of the students is required for taking this course		

CHEM2202 Chemical instrumentation (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	80
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	To cover the basic principles and applications of chemical instrumentation. This course aims to provide working knowledge, in addition to the principles, of instruments that are commonly used in chemical laboratories.		
Course Contents	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic mass spectrometry; grating spectrometer; photon detectors and thermal detectors. Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumental set up of HPLC and GC. Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the principles of the optical methods, separation methods, and mass spectrometry. - Describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes. - Apply experimental skills in chemical analysis including sample preparation, standard solution preparation, instrument calibration, and matrix effects correction (standard additions)		

Pre-requisites	Pass in CHEM1002 or (CHEM1004 and CHEM2510) or CHEM1007 or CHEM1009		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 12 tutorials, and 7 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment which includes laboratory work and tests (25% weighting)		
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.		
Textbooks	D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition). D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition)		

CHEM2207 Food and water analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	120
Course Co-ordinator	Dr Y S Fung, Chemistry		
Course Aim	To cover areas in the application and new methodology development in Analytical Chemistry with focus on food and water analysis.		
Course Contents	Chemical Analysis in Practicing Laboratories: Use of standard methods, guidelines and standards for food and environmental analysis; good laboratory practice; reliability and quality issues. Water Analysis: QA/QC and automation in water analysis; sampling, pretreatment, storage and analysis of clean, dirty, environmental and industrial processing waters; quality standards of water bodies; laboratory, onsite and field analysis. Food Analysis: Requirement of nutritional labeling; analysis of major composition, minor additives and trace contaminants in food; analysis of natural and imitated food products; recent issues and case studies in food analysis. New Techniques: Selective electrodes; electrophoresis and mass spectrometry for food and water analysis.		
Learning Outcomes	On successful completion of this course, students should be able to: - identify and determine errors and uncertainty of analytical results - apply measures taken to control quality and ensure reliability of analytical results - demonstrate a general knowledge in food and water analysis - understand issues in public health protection related to chemical analysis - carry out analytical techniques used in practicing food and water laboratories		
Pre-requisites	Pass in CHEM1002 or CHEM1003 or CHEM1004 or CHEM1007 or CHEM1009; and Pass in CHEM2202, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 8 tutorials and 4 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (75% weighting) and coursework assessment (25% weighting) that includes laboratory work, assignments, and tests		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate through a thorough grasp of the knowledge and skills required in theory and laboratory work in food and water analysis to acquire accurate results with full interpretation for analytical application as described in all the course learning outcomes. Show strong analytical and critical abilities, logical thinking and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water.Apply highly effective organization and presentation skills as shown in class work. B: Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work. C: Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of		

		complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work.
	D	Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems related to the analysis of food and water. Apply limited or barely effective organization and presentation skill as shown in class work.
	Fail	Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to the analysis of food and water. Organization and presentation skills are minimally effective or ineffective as shown in class work.
Textbooks	D. A. Skoog, D. M. West, and F. J. Holler: Fundamentals of Analytical Chemistry (Brook/Cole -Thomson Learning, latest edition)	
References	References to specialist texts and other published material will be made throughout the course.	

CHEM2303 Intermediate Inorganic Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	80
Course Co-ordinator	Prof V W W Yam, Chemistry		
Course Aim	This course is a continuation from 'Chemistry: the molecular world', with a more detailed treatment of general inorganic chemistry, with examples relevance to biological processes and material science, suited to the needs of those intending to extend their studies in chemistry.		
Course Contents	Chemistry of selected classes of inorganic, coordination and organometallic compounds including mechanisms of their reaction where appropriate. Structure, bonding, magnetism and spectral properties of inorganic systems including examples in bioinorganic systems.		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate knowledge of chemistry of selected classes of inorganic, coordination and organometallic compounds. - Understand structure, bonding, magnetism and spectral properties of inorganic systems. - Understand mechanisms of selected chemical reactions that are essential to coordination and organometallic compounds. - Gain appropriate knowledge of coordination compounds in biological systems.		
Pre-requisites	Pass in CHEM1003; and Not for students who have already passed in CHEM2302 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 6 tutorials and 6 x 4-hour laboratory sessions		
Assessment Method	One 3-hour written examination (75% weighting). Continuous assessment of practical work and assignments (25%)		
Course Grade	A+ to F		

Grade Descriptors		
	A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show strong ability to apply and integrate knowledge and theory relating to the more advanced 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 essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate highly effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show evidence to apply and integrate knowledge and theory relating to the more advanced 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 essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.
	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show evidence of some abilities to apply and integrate knowledge and theory relating to the more advanced 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 essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate moderately effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate partially effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.
		Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show little or no evidence of abilities to apply and

	Fail	integrate knowledge and theory relating to the more advanced 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 essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate minimally effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.
Textbooks	-Shriver & Atkins, Inorganic Chemistry (4th Ed.), Oxford University Press, 2005 - Catherine, Housecroft & Sharpe, Inorganic Chemistry (3nd Ed.), Prentice Hall, 2008	

CHEM2304 Bioinorganic Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Prof H Z Sun, Chemistry		
Course Aim	This course is a continuation from Basic Inorganic Chemistry and Basic Organic Chemistry, giving further and more details of inorganic chemistry in biological system, with examples relevance to biological processes and medical science, suited to the needs of those intending to extend their studies in (bio)chemistry and biomedical science.		
Course Contents	Bioinorganic Chemistry of selected topics of interest. Examples include the inorganic chemistry (and biochemistry) behind the requirement of biological cells for metals such as zinc, iron and copper; and metals in medicine such as mechanisms by which organisms obtain required metal ions from their environment, and use of metal-containing compounds in treating diseases such as cancer.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the principles and concepts of inorganic/organic chemistry in biological system. - Understand structure, bonding, and spectral properties of selected metals in proteins and nucleic acids. - Understand chemical mechanisms of selected metal homeostasis (i.e. uptake, transport and storage). - Understand the role of metal complexes medicine.		
Pre-requisites	Pass in CHEM1002 and CHEM1003 and CHEM2303		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures, 6 tutorials and 6 hours of literature survey and presentation		
Assessment Method	One 3-hour written examination (75% weighting). Continuous assessment of assignments and presentation (25%)		
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 bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate highly effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic 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 bioinorganic chemistry. Demonstrate moderately effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic 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 bioinorganic chemistry. Demonstrate partially effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
	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 bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic 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 bioinorganic chemistry. Demonstrate minimally effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.	
Textbooks	1. Lippard, S. J. and Berg, J. M. Principles of Bioinorganic Chemistry (University Science Books; Mill Valley, CA, 1994 2. Bertini, I.; Gray, H. B.; Stiefel, E. I.; Valentine, J. S., editors. Biological Inorganic Chemistry: Structure and Reactivity, University Science Books, 2007		

CHEM2403 Intermediate Organic Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	90

Course Co-ordinator	Prof D Yang, Chemistry		
Course Aim	As a continuation from CHEM1003, this course aims to provide a solid foundation of organic chemistry. It focuses primarily on the basic principles to understand the structure and reactivity of organic molecules, with examples illustrating the role of organic chemistry in biology, medicine, and industry.		
Course Contents	Chemistry of common organic functional groups: ketones and aldehydes; carboxylic acids and their derivatives; amines and heterocycles; aromatic chemistry. Principles of organic synthesis.		
Learning Outcomes	On successful completion of this course, students should be able to: - Define and employ the vocabulary of organic chemistry - Draw correct structural representations of organic molecules - Understand the basic principles of structure and reactivity of organic molecules - Write reasonable mechanisms for transformations of carbonyl compounds (aldehydes, ketones, carboxylic acids, acyl halides, anhydrides, esters, amides), nitriles, and amines - Appreciate the importance of organic chemistry in daily life - Devise synthetic pathways to organic compounds using functional group chemistry - Perform the laboratory synthesis, purification, and characterization of organic compounds		
Pre-requisites	Pass in CHEM1003; and Pass in CHEM2510, or already enrolled in this course; Not for students who have already passed in CHEM2402 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 6 tutorials, 6 x 4 hour laboratory		
Assessment Method	One 3-hour written examination (60% weighting) and continuous assessment (40%).		
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 lab skills and techniques. 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. 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. 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. 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 skills and techniques.		
Textbooks	J. McMurry, "Organic Chemistry", 8th Ed., Thomson Brooks/Coles, 2012. S. McMurry, "Study Guide and Student Solutions Manual for Organic Chemistry", 8th Ed., Thomson Brooks/Coles, 2012. J.W. Lehman, "Operational Organic Chemistry", 4th Ed., Pearson/Prentice Hall, 2009.		

CHEM2410 Analytical techniques for pharmacy students (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	30
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	This course is designed for Bachelor of Pharmacy students to provide an overview of different analytical and measurement techniques that are important to pharmacology and pharmaceutical sciences.		
Course Contents	Principles and Applications of different analytical and measurement techniques in pharmaceutical sciences such as drug analysis and pharmacokinetics studies Analysis and quality assurance: statistical analysis of data, control chart. Analysis by Optical methods: Beer's Law; instrumentation, grating spectrometer, detectors; absorption spectrometry: UV-visible, infrared, and atomic; emission spectrometry. Sample Separation and Purification: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumentation of HPLC and GC. Molecular Mass Measurements: mass spectrometry-fundamental concepts; various ionization techniques including electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers; use of mass spectrometry in drug analysis.		
Learning Outcomes	On completion of the course, the students should be able to: - Demonstrate knowledge and understanding of the principles of different optical methods, separation methods, mass spectrometry and their applications in pharmaceutical sciences - Describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes. - Apply experimental skills in chemical analysis including sample preparation, standard solution preparation, instrument calibration, matrix effects correction (standard additions).		
Pre-requisites	For BPharm students only; and Pass in CHEM1410		
Offer in 2012 - 2013	2nd sem	**Examination**	May

Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 7 x 4-hour laboratory sessions
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment (25% weighting)
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.
Textbooks	D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition). D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition).
Remarks	This course is for pharmacy students only. This course is equivalent to CHEM2003.

CHEM2504 Physical Chemistry I: Introduction to Quantum Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	80
Course Co-ordinator	Prof A S C Cheung, Chemistry		
Course Aim	The course presents fundamental principles and topics on quantum chemistry in order to provide a soiled foundation for students intending to further their studies in chemistry.		
Course Contents	Elementary quantum mechanics: Historical development, Postulates of quantum mechanics, Principles of quantum mechanics, Theory of angular momentum, Heisenberg uncertainty principle. Applications to simple systems: particle in a box, harmonic oscillator, rigid rotator; Atomic structure: Hydrogen and many electron atoms. Molecular structure and chemical bonds. Approximation methods: variational method, Hartree-Fock method, valence bond theory, and perturbation theory.		
Learning Outcomes	On successful completion of this course, students should be able to: -understand and use the terminology and nomenclature in quantum chemistry and topics discussed in the course. -demonstrate knowledge and understanding of basic concepts in quantum mechanics, atomic and molecular structure -understand elementary numerical procedures and the basic relationships of quantum mechanics and molecular systems. -hands-on experience of the application of Hartree-Fock method to molecules.		
Pre-requisites	Pass in CHEM1002; and Not for students who have already passed in CHEM2503 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 6 tutorials and 6x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (75% weighting). Continuous assessment of practical work and assignments (25%)		
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 thorough grasp of the subject, 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. 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 substantial grasp of the subject, 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. 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 general but incomplete grasp of the subject, 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. 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 partial but limited grasp of the subject, retention of some relevant information of the subject, 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. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show little or no grasp of the knowledge and understanding of the subject, very little or no ability to apply knowledge to solve problems. Apply minimally effective or		

		ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.
Textbooks	D. A. McQuarrie: Quantum Chemistry (2nd Edition, 2007) I.. N. Levin: Quantum Chemistry (5th Edition, 2008)	

CHEM2509 Principles of chemical biology (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Dr X C Li, Chemistry		
Course Aim	To understand how to use chemical approaches to emulate biological system to study natural molecules and generate new functional molecules. Useful as an introduction to research in areas of chemical biology, medicinal chemistry and biotechnology.		
Course Contents	Introduction of chemical and combinatorial approaches, Chemical aspects of biomolecules and their applications. The contents include Chemical Biology of Nucleic acids, Proteins, and Glycobiology, Genomics, Proteomics as well as the generation of new functional molecules.		
Learning Outcomes	On successful completion of this course, students should be able to: - Give examples of how to use chemical methods to produce new molecules with biological functions. - Demonstrate understanding of the connections between chemistry and biology associated with drug discovery and biotechnologies. - Compare chemical biology and traditional biology approaches in drug discovery		
Pre-requisites	Pass in CHEM1003 or CHEM1401 or CHEM1406 or BIOC1001		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures and 12 tutorials		
Assessment Method	One 3-hour written examination (60% weighting) and course work assessment (40% weighting)		
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. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.	
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.	
	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. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly.	
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Use and reference of several sources, but mainly through summary rather than analysis and comparison.	
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Limited use of secondary sources and no critical comparison of them.	
Textbooks	Andrew Miller and Julian Tanner: Essentials of chemical biology: structure and dynamics of biological macromolecules		

CHEM2510 Principles and applications of spectroscopic and analytical techniques (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	120
Course Co-ordinator	Dr X Li, Chemistry		
Course Aim	To cover the principles and applications of modern practical spectroscopic and analytical techniques. This course is a pre-requisite for the advanced chemistry courses.		
Course Contents	UV-Visible Absorption Spectroscopy, Nuclear Magnetic Resonance Spectroscopy, Mass Spectrometry, Infra-red Spectroscopy, Elemental Analysis, Molecular Formulas and analysis of data.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic principles and applications of IR, UV/Vis, MS and NMR spectroscopic techniques. - Describe and explain the terminology of IR, UV/Vis, MS and NMR spectroscopies. - Perform chemical structure elucidation and analysis based on UV/Vis, MS and NMR spectroscopic data		
Pre-requisites	Pass in any CHEM1XXX level course; and Not for students who have already passed CHEM2507 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures and 12 hours of tutorials		
Assessment Method	One 3-hour written examination (70%), course work assessment (15%) and two quizzes (15%)		

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, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.
Textbooks	Donald L. Pavia, Gary M. Lampman, George S. Kriz: Introduction to Spectroscopy (Thomson Learning, 2001, 3rd and 4th editions.)	
Remarks	Suggested follow-up course: CHEM2202	

CHEM3105 Chemistry project (12 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	---
Course Co-ordinator	Prof D L Phillips, Chemistry		
Course Aim	To provide experience of research techniques by working on a short project under the direct supervision of a member of staff. This course would prepare students for graduate school work in chemistry.		
Course Contents	A short research project provided by a member of staff (e.g. the students supervisor).		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the terminology and nomenclature associated with their own research chemistry project - Demonstrate knowledge and understanding of the chemical techniques they used to do the research in their own chemical project - Demonstrate knowledge and understanding of the results of their own chemistry project and its context in the broader research area		
Pre-requisites	Pass in CHEM2202; and CHEM2302 or CHEM2303; and CHEM2402 or CHEM2403; and CHEM2503 or CHEM2504		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Laboratory time not less than 8 hours per week for 24 weeks or longer		
Assessment Method	A thesis of about 3,000 to 5,000 words (100% weighting) to be submitted at the end of the session. Students will be expected to give seminars on their work at the end of the course which will be assessed in conjunction with the thesis.		
Course Grade	A+ to F		
Grade Descriptors	A	Show an extensive comprehension of the research project. Demonstrate very able analytical and critical thought with presence of some originality. Illuminating utilization and critical analysis / evaluation of information acquired from a wide range of high quality sources. Critical employment of data and results to synthesize appropriate and illuminating conclusions. Demonstrate integration of a wide range of appropriate theories, principles, data and methods. Employ very effective organizational and presentational skills. [Work of A+ should demonstrate substantial additional work beyond that is required in wider areas relevant to the topic.]	
	B	Show a substantial comprehension of the research project. Demonstrate able analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose meaningful comparisons between different secondary interpretations. Correct utilization of data and results to form appropriate conclusions. Compose general integration of theories, principles, data and methods. Perform effective organizational and presentational skills.	
	C	Show a general but incomplete comprehension of the research project. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.	
	D	Show a partial but limited comprehension, with knowledge of some relevant information, of the research project. Presence of some coherent and logical thinking, but with limited analytical and critical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective organizational and presentational skills.	
	Fail	Show little or no comprehension of the research project. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.	
Textbooks	Specialist texts depend on the selected topic.		
Remarks	Second year students with exceptional academic achievement may also apply for this course		

CHEM3106 Symmetry, group theory and applications (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	60
Course Co-ordinator	Prof V W W Yam, Chemistry		

Course Aim	To introduce the concepts of symmetry and group theory and to apply them in solving chemical problems. This course also provides an introductory treatment of bonding theories, inorganic electronic and vibrational spectroscopy. This course is essential for students who wish to take advanced courses in inorganic chemistry and all types of spectroscopy.		
Course Contents	Symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; hybrid orbitals; molecular orbital theory for organic, inorganic and organometallic systems; selected applications in electronic and vibrational spectroscopy.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic principles and concepts of symmetry and group theory and to apply them in solving chemical problems - Demonstrate knowledge and understanding in the use of character tables and projection operator techniques - Demonstrate knowledge and understanding of bonding theories involving hybrid orbitals and molecular orbitals for organic, inorganic and organometallic systems - Demonstrate knowledge and understanding in the application of symmetry and group theory in electronic and vibrational spectroscopy		
Pre-requisites	Pass in CHEM2303		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures and tutorials		
Assessment Method	One 3-hour written examination (75% weighting) and continuous assessment (25% weighting)		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show strong ability to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to the principles and applications of symmetry and group theory.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show evidence to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the principles and applications of symmetry and group theory.
C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show 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 principles and applications of symmetry and group theory.
D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the principles and applications of symmetry and group theory.
Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show 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 principles and applications of symmetry and group theory.

Textbooks	F.A. Cotton: Chemical Applications of Group Theory (Wiley, 3rd ed., 1990)

CHEM3107 Interfacial science and technology (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Prof K Y Chan, Chemistry		
Course Aim	To understand the science and technology of interfacial phenomena and processes often appeared in high value added products and modern technologies.		
Course Contents	Physics and Chemistry of Interfaces: coatings and surfactants, colloids and interfaces, wetting, microemulsion, thin films, nanomaterials, porous materials.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand interfacial phenomena and their origin from molecular details. - Solve problems in interfacial science and technology by applying knowledge of general chemistry, thermodynamics, and kinetics.		

	- Be familiarized with technologies that require application of interfacial science, including nanomaterials, nanotechnology, detergency, composite polymers, and porosimetry		
Pre-requisites	Pass in CHEM2503 or CHEM2504		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 12 tutorials		
Assessment Method	One 2-hour written examination (70% weighting) and continuous assessment (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough knowledge of interfacial science and technology, and mastery of skills required for attaining all of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to solve problems in a wide range of complex, familiar and unfamiliar situations. Critical use of data and sourcing of references. Apply highly effective organizational and presentational skills. B: Demonstrate substantial knowledge of interfacial science and technology and command of skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete knowledge of interfacial science and technology and command of skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited knowledge of interfacial science and technology and command of skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of knowledge of interfacial science and technology, and command of skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Misuse of data and references. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	Barnes and Gentle: Interfacial Science		

CHEM3110 Advanced materials (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Prof W K Chan, Chemistry		
Course Aim	This course is a continuation from Introdution to Materials Chemistry. It provides a more compreheisive overview on materials chemistry and application of materials in advanced technology. The most recent development in materials chemistry will also be discussed.		
Course Contents	Advanced polymerization methods: copolymerization and applications of copolymers, coordination polymerization, control of stereochemistry in polymers; ionic and radical living polymerization. Materials for specialty applications: high strength materials; high temperature polymers, polyelectrolytes, conducting polymers, optical information storage, sensors, photonics, electronics, nanotechnology. Advanced materials characterization techniques.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the mechanisms and kinetics of copolymerizations, coordination polymerizations, and living polymerizations; - identify examples of some engineering polymers for high temperature/high strength applications, and how are their properties affected by the molecular structures; - demonstrate knowledge in advanced materials characterization techniques; - understand the working principles of materials for information storage and opto-electronic applications		
Pre-requisites	Pass in CHEM2109		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours lecture/tutorial		
Assessment Method	One 3-hour written examination (85%), continuous assessment (15%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show strong ability to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to advanced materials synthesis and their properties. B: Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties. C: Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of some abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. 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 advanced materials synthesis and their properties. D: Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. 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 advanced materials synthesis and		

		their properties.
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. 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 advanced materials synthesis and their properties.
Textbooks	G. Odian: Principles of Polymerizations (John Wiley and Sons, 2004) Other specialist references will be given throughout the course.	

CHEM3204 Modern chemical instrumentation and applications (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Dr I K Chu, Chemistry		
Course Aim	The aim of the course is to provide an understanding of modern instrumentation, covering both fundamental principles and practical aspects of instrument design. The course will be of particular benefit to those pursuing a higher research degree or a career in technical sales/service.		
Course Contents	Biological Mass spectrometry: Liquid Chromatography-Tandem Mass Spectrometry for Proteomics & Metabolomics. Laser Spectroscopy: Principle of laser; three-level and four-level lasers; laser instrumentation (Q-switching and frequency conversion); laser-induced fluorescence; laser atomic spectrometry; laser remote sensing; signal-to-noise enhancement by boxcar integration and photon counting. Atomic Plasma Spectrometry: Inductively couple plasma-atomic emission spectrometry (ICP-AES) and mass spectrometry (ICP-MS); signal-production processes in ICP spectrometry; Echelle grating spectrometer; array detectors; interferences in ICP-AES and ICP-MS. Atomic X-ray Spectrometry: x-ray fluorescence; wavelength-dispersive (WDXRF) and energy-dispersive (EDXRF) X-ray fluorescence spectrometers Nuclear Magnetic Resonance Spectroscopy: Principle and instrumentation		
Learning Outcomes	On successful completion of this course, students should be able to: - Explain the principles of the modern mass spectrometric methods for proteins and metabolites identification and quantification; - Explain how proteins are identified and sequenced experimentally and how data is generated in proteomics experiments; - Use the database searching techniques and software tools to analyze high-throughput proteomics data; - Apply LC/MS/MS method for target quantitative analysis of small molecules. - Explain the principles of the laser spectroscopy, atomic plasma spectrometry, and atomic x-ray spectrometry. - Describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes.		
Pre-requisites	Pass in CHEM2202		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 12 tutorials, and 4 x 4-hour laboratory sessions		
Assessment Method	One 2-hour written examination (75% weighting) and course work assessment which includes laboratory work and tests (25% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze problems related to fundamental principles and practical aspects of instrument design. B: Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show evidence to apply and integrate knowledge and theory, and ability to analyze problems related to fundamental principles and practical aspects of instrument design. C: Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations to fundamental principles and practical aspects of instrument design. D: Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to fundamental principles and practical aspects of instrument design. Fail: Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show little or no evidence of abilities to apply and integrate knowledge and theory, and little or no ability to analyze problems to most familiar situations related to fundamental principles and practical aspects of instrument design.		
Textbooks	Chhabil Dass: Fundamentals of contemporary mass spectrometry (Wiley-Interscience) D.A. Skoog, F.K. Holler, S.R. Crouch: Principles of Instrumental Analysis (Thomson, latest edition)		
References	Reference to published material will be made throughout the course.		

CHEM3206 Analytical Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	100
Course Co-ordinator	Dr Y S Fung, Chemistry		
Course Aim	The aim of the course is focus on the basic principle, practice and methodology in chemical analysis and		

	associated application for determining analytes in gas, liquid and solid samples.		
Course Contents	Principles and Methodologies: Analytical information; Errors and uncertainties; Chemometrics; Statistical hypothesis testing in chemical analysis; Assessing performance of analytical methods and procedures. Reliability in chemical measurement: Quality assurance in chemical analysis; Good laboratory practice; Hong Kong Laboratory Accreditation Scheme (HOKLAS); Validation and comparability of chemical measurement. Application of chemical analysis for gas, liquid and solid samples.		
Learning Outcomes	On successful completion of this course, students should be able to: - find information from analytical literature - assess analytical methodology for its scope in application - apply Chemometric methods to assess data quality, validate results and interpret their significance - carry out chemical and instrumental analysis for a given task - select suitable analytical method to solve problems in gas, liquid and solid samples - understand issues and limitations of chemical analysis - literacy in analytical knowledge		
Pre-requisites	Pass in CHEM2202 or CHEM2207		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 6 tutorials and 6 x 4 hours of practicals		
Assessment Method	One 3-hour written examination (75% weighting). Continuous assessment (25%)		
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, logical thinking and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply highly effective organization and presentation skills as shown in class work. B: Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work. C: Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of complex issues and problems related to chemical analysis. Apply effective organization and presentation skills as shown in class work. D: Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems related to chemical analysis. Apply limited or barely effective organization and presentation skill as shown in class work. Fail: Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to chemical analysis. Organization and presentation skills are minimally effective or ineffective as shown in class work.		
Textbooks	D.A Skoog, D.M. West, and F.J. Holler: Fundamentals of Analytical Chemistry (Brook/Cole Thomson Learning, latest edition).		
References	References to specialist texts and other published materials will be made throughout the course.		

CHEM3304 Organometallic chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	40
Course Co-ordinator	Prof V W W Yam, Chemistry		
Course Aim	To give further, more detailed, treatment to organometallic chemistry mentioned in Intermediate Inorganic Chemistry. The course also aims to introduce and familiarize students with advanced laboratory techniques, and to prepare students for graduate work in inorganic and organometallic chemistry.		
Course Contents	Lectures: Main group and transition metal organometallics. Transition metal cluster chemistry. Bonding, structure and reactivities of organometallics. Application of organometallics in organic synthesis and catalysis. Laboratory: To introduce and familiarize students with advanced laboratory techniques which include the synthesis and manipulation of air- and moisture- sensitive compounds, and their characterization by various spectroscopic methods.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the advanced principles and concepts in organometallic chemistry - Demonstrate knowledge and understanding in the bonding, structure and reactivities of main group and transition metal organometallics, especially in transition metal clusters, metal alkyls, metal alkylidenes and metal alkylidynes - Demonstrate knowledge and understanding in the application of organometallics in organic synthesis, polymerization and catalysis - Demonstrate ability in advanced laboratory techniques including the synthesis and manipulation of air- and moisture- sensitive compounds, and their characterization by various spectroscopic methods		
Pre-requisites	Pass in CHEM2303		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures + 5 tutorials and 6 x 5-hour laboratory sessions		
Assessment Method	One 3-hour written examination (75% weighting) and continuous assessment including practical work (25% weighting)		

Course Grade	A+ to F	
Grade Descriptors	A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show strong ability to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic 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 advanced principles and applications of organometallic chemistry. Demonstrate highly effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show evidence to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic chemistry. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the advanced principles and applications of organometallic chemistry. Demonstrate effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.
	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show evidence of some abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic 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 advanced principles and applications of organometallic chemistry. Demonstrate moderately effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic 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 advanced principles and applications of organometallic chemistry. Demonstrate partially effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more detailed and advanced treatment of organometallic chemistry, especially those related to structure, bonding and reactivities of main group and transition metal organometallics; transition metal cluster chemistry; and application of organometallics in organic synthesis and catalysis. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the advanced principles and concepts of organometallic 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 advanced principles and applications of organometallic chemistry. Demonstrate minimally effective advanced laboratory skills and techniques, especially in the synthesis and manipulation of air- and moisture- sensitive compounds and their characterization by various spectroscopic methods.
Textbooks	R. H. Crabtree: The Organometallic Chemistry of the Transition Metals (Wiley, 2005, 4th ed.) C. Elschenbroich and A. Salzer: Organometallics - A Concise Introduction (VCH, 1992, 2nd revised edition)	
References	Reference to specialist texts and other published materials will be made throughout the course.	

CHEM3305 Advanced Inorganic Chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	40
Course Co-ordinator	Prof C M Che, Chemistry		
Course Aim	This course is a continuation from Intermediate Inorganic Chemistry, giving further and more detailed treatment to topics in Inorganic Chemistry and new areas of interest. Problem based learning on selected advance topics will be introduced in the later part of the course. This course also aims to prepare students for graduate work.		
Course Contents	Selected advanced topics of current interest. Examples include metal-metal bonds and metal-ligand multiple bonds, inorganic and supramolecular photochemistry, lanthanide chemistry, bio-inorganic and medicinal chemistry, and activation of small molecules by metal complexes.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the electronic structure and bondings of novel metal-metal and metal-ligand multiple bonded metal complexes - Understand the principles and concepts of inorganic and supramolecular photochemistry. - Understand and realize the activation of small molecules by transition metal complexes and realize the importance of such activation in chemical catalysis of global interest, green chemistry and energy saving reactions. - Introduction to the chemistry of lanthanide coordination compounds and their applications in material science, catalysis and biomedical sciences. - Understand the role of metal complexes in bio-inorganic and medicinal chemistry.		
Pre-requisites	Pass in CHEM2302 or CHEM2303; and Pass in CHEM3106, or already enrolled in this course; and Not for students who have passed in CHEM3303 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 lectures, 6 tutorials and 6 hours of literature survey and presentation		
Assessment Method	One 3-hour written examination (80% weighting). Continuous assessment (20%)		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the frontiers in inorganic chemistry. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze novel problems in inorganic chemistry. Apply highly effective organizational and presentational skills.	
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence to apply and integrate knowledge and theory, and ability to analyze novel problems of inorganic chemistry. Apply effective organizational and presentational skills.	

	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations in inorganic chemistry. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations in inorganic chemistry. Demonstrate partially effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. 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 in inorganic chemistry. Demonstrate minimally effective organizational and presentational skills.
Textbooks	F.A. Cotton, G. Wilkinson, Hurillo and Bochmann: Advance Inorganic Chemistry (Wiley, 1999, 6th ed.)	
References	References to specialist texts and other published materials will be made throughout the course.	

CHEM3404 Advanced organic chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Prof D Yang, Chemistry		
Course Aim	To provide students with knowledge in organic chemistry reaction mechanisms and organic compound structure determination.		
Course Contents	The course covers chemical bonding, advanced stereochemistry, conformational analysis, techniques for investigating reaction mechanisms, reactive intermediates, rearrangement reactions, and pericyclic reactions.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe, analyze and interpret the structure and reactivity relationship of organic molecules - Identify and predict the selectivities (chemoselectivity, regioselectivity and stereoselectivity) in organic reactions - Describe the general approaches to study organic mechanisms - Have a general understanding and working knowledge of pericyclic reactions, reactive intermediates (radicals, carbenes and nitrenes), and polar rearrangements - Suggest reasonable mechanistic pathways for some types of organic reactions - Apply the knowledge of reaction mechanisms in design of synthetic routes for organic compounds		
Pre-requisites	Pass in CHEM2402 or CHEM2403		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures and 12 tutorials		
Assessment Method	One 3-hour written examination (70% weighting) and coursework (30% weighting)		
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. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.		
Textbooks	F.A. Carey and R.J. Sunberg, "Advanced Organic Chemistry, Part A: Structure and Mechanism" 5th Ed.: Springer, 2007. J. McMurry, "Organic Chemistry" 8th Ed., Thomson Brooks/Cole, 2012. S. McMurry, "Study Guide and Student Solutions Manual for Organic Chemistry", 8th Ed., Thomson Brooks/Cole 2012. I. Fleming, "Pericyclic Reactions" Oxford University Press, 1999.		

CHEM3405 Organic chemistry of life (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	50
Course Co-ordinator	Dr P H Toy, Chemistry		
Course Aim	The major objective of this course is to give the students an understanding and appreciation of the role of organic chemistry in biology and biochemistry.		
Course Contents	The chemistry of organic molecule groups such as carbohydrates, amino acids, peptides, coenzymes, nucleotides and lipids will discussed. Enzyme catalysis, cofactors and inhibitors will also be presented.		
Learning Outcomes	On successful completion of this course, students should be able to: - have a basic understanding of biologically important organic molecules - have a basic understanding of enzyme catalysis - appreciate how organic chemistry plays an important role in biology and biochemistry		

Pre-requisites	Pass in CHEM1401 or CHEM1406 or CHEM2402 or CHEM2403
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 12 tutorials
Assessment Method	One 2-hour written examination (60%), 2 mid-term tests (30%) and an oral presentation (10%)
Course Grade	A+ to F
Grade Descriptors	
	A: Demonstrate thorough mastery at an advanced level of extensive biomolecule organic chemistry knowledge, and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar problems. Apply highly effective organizational and presentational skills.
	B: Demonstrate substantial command of biomolecule organic chemistry with a broad range of knowledge, and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar problems. Apply effective organizational and presentational skills.
	C: Demonstrate general but incomplete command of biomolecule organic chemistry knowledge, and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems. Apply moderately effective organizational and presentational skills.
	D: Demonstrate partial but limited command of biomolecule organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
	Fail: Demonstrate little or no evidence of command of biomolecule organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Bruice, P. Y.; Organic Chemistry (Pearson, 2007, 5th edition), chapters 21-27

CHEM3406 Integrated Organic Synthesis (6 credits)	**Academic Year**: 2012
Offering Department	Chemistry — **Quota**: ---
Course Co-ordinator	Prof P Chiu, Chemistry
Course Aim	To introduce aspects of modern organic reactions with relevance to and in the context of the synthesis of natural products, drugs and medicinal chemistry to provide an integrated approach to the subject, and to provide training in advanced organic laboratory skills, and further hands-on experience in synthesis and characterization, as preparation for graduate studies or research in organic chemistry.
Course Contents	Building on the organic chemistry covered in the foundational courses CHEM1003 and CHEM2402, this course will present modern synthetic methods and synthetic planning. The course is organized into units based on target drug molecules. In each unit, the chemical biology of these compounds are briefly presented and the syntheses of these molecules are introduced, accompanied by in-depth discussions of the reactions involved with emphasis on their mechanisms, selectivity, stereochemistry, scope and limitations. Concept of synthetic design including retrosynthetic analysis, stereoselectivity and enantioselective control elements will be emphasized. A laboratory section provides training in the practical skills of synthesis.
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the conditions, selectivities, mechanisms of several classes of important reactions - Apply the knowledge of organic reactions toward solving problems in synthesis and synthetic design - Know some strategies of enantioselective control - Be able to perform organic synthesis experiments of an increased level of technical difficulty
Pre-requisites	Pass in CHEM2402 or CHEM2403; and Not for students who have passed in CHEM3403 before.
Offer in 2012 - 2013	2nd sem — **Examination**: May
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures and 5 x 5 hours of laboratory
Assessment Method	One 3-hour written examination (70% weighting), continuous assessment and laboratory (30%)
Course Grade	A+ to F
Grade Descriptors	
	A: Demonstrate a thorough mastery at an advanced level of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show a strong ability to integrate knowledge and theory, and a strong ability to analyze novel synthetic organic chemistry situations and problems. Show a critical use of knowledge and data to apply to the solution of novel and complex synthetic problems. Demonstrate highly effective organization and application of lab skills and techniques in synthetic experiments.
	B: Demonstrate a substantial command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of ability to integrate knowledge and theory, and evidence of ability to analyze synthetic organic chemistry situations and problems. Show a correct use of knowledge and data to apply to the solution of some novel and most familiar synthetic problems. Demonstrate effective organization and application of lab skills and techniques in synthetic experiments.
	C: Demonstrate a general but incomplete command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of some ability to integrate knowledge and theory, and evidence of some ability to analyze synthetic organic chemistry situations and problems. Show a correct use of knowledge to apply to the solution of most familiar problems. Demonstrate moderately effective organization and application of lab skills and techniques in synthetic experiments.
	D: Demonstrate a partial but limited command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of a limited ability to integrate knowledge and theory, and a limited ability to analyze familiar situations and problems. Show some correct but erroneous use of knowledge to apply to the solution of most familiar problems. Demonstrate partially effective organization and application of lab skills and techniques in synthetic experiments.
	Fail: Demonstrate little or no evidence of command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show little or no evidence of ability to integrate knowledge and theory in synthetic organic chemistry, and little or no ability to analyze most familiar situations and problems. Show mostly erroneous

		use of knowledge to apply to the solution of familiar problems. Demonstrate minimally effective organization and application of lab skills and techniques in synthetic experiments.
References	Organic synthesis, C. Willis, M. Wills, Oxford Science Publications Top drugs, top synthetic routes, J. Saunders, Oxford Science Publications	

CHEM3407 Medicinal chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	140
Course Co-ordinator	Prof H Z Sun, Chemistry		
Course Aim	This course covers the chemical principles of drug design and drug action and uses as an introduction to research in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, pharmaceutical chemistry, and biotechnology.		
Course Contents	- Drug discovery, design, and development: lead discovery, pharmacophore, structure-activity relationships (SAR), computer-aided drug design, combinatorial chemistry and high-throughput drug screening - Drug-receptor interactions - Proteins (and enzymes) and nucleic acids as drug targets - Metals in medicine - DNA-Drug interactions - Drug metabolism and prodrugs and drug delivery		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate knowledge of drug discovery, design and development - Understand drug-biomolecule interactions where appropriate - Gain appropriate knowledge of drug metabolism and drug delivery		
Pre-requisites	Pass in CHEM1003 or CHEM2402 or CHEM2403 or CHEM3405		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures, 12 tutorials		
Assessment Method	One 3-hour written examination (75% weighting); Continuous assessment of practical (25% weighting)		
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 medicinal chemistry, especially those related to drug discovery, design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate highly effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
	B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
	C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate moderately effective basic techniques, basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate partially effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
	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 medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate minimally effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
Textbooks	- An Introduction to Medicinal Chemistry (3/e), G.L. Patrick, Oxford University Press, 2005 - Medicinal Chemistry- An Introduction, G. Thomas, John Wiley, 2000 - D. Wang, S.J. Lippard (2004) Nat. Rev. Drug Dis., Cellular processing of platinum anticancer drugs, 4, 307-320	

CHEM3410 Medicinal chemistry for pharmacy students (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	30
Course Co-ordinator	Prof H Z Sun, Chemistry		
Course Aim	This course presents the chemical principles of drug design and drug action, which is essential in the training for a pharmaceutical career. It builds on previous knowledge in organic chemistry and extends it to drug discovery,		

	design, and development. It also comprehensively discusses drug-biomolecule interactions, drug metabolism, drug delivery and important research techniques in the drug discovery process.		
Course Contents	Drug discovery, design, and development: lead discovery, pharmacophore, structure-activity relationships (SAR), computer-aided drug design, combinatorial chemistry and high-throughput drug screening. Drug-receptor interactions. Proteins and enzymes as drug targets. Metalloenzymes: structures and functions. Metals in medicine. DNA-Drug interactions. Drug metabolism. Prodrugs and drug delivery.		
Learning Outcomes	On successful completion of the course, students should be able to: - Demonstrate knowledge in the principles of drug discovery, design and development - Understand the basic drug-biomolecule interactions - Demonstrate knowledge of the principles in drug metabolism and drug delivery		
Pre-requisites	For BPharm students only; and (CHEM1401 or CHEM1411) and CHEM2410		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	32 lectures, 3 hours presentations, and 3 hours laboratory demonstrations		
Assessment Method	One 3-hour written examination (75% weighting) and course work assessment (25% weighting)		
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 medicinal chemistry, especially those related to drug discovery, design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate highly effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate moderately effective basic techniques, basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate partially effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.
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 medicinal chemistry; especially those related to drug discovery; design and development; drug targets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and its relevance to toxicity. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of medicinal 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 medicinal chemistry. Demonstrate minimally effective basic techniques for medicinal chemistry, especially in drug discovery and metabolism.

Textbooks	G. L. Patrick: An Introduction to Medicinal Chemistry (Oxford, 2009, 4th ed.) G. Thomas: Medicinal Chemistry: An Introduction (Wiley, 2000) T. Nogrady, D.F. Weaver Medicinal Chemistry- A Molecular and Biochemical Approach (Oxford, 2005, 3rd ed.) S. J. Lippard & J. M. Berg: Principles of Bioinorganic Chemistry (1994)

CHEM3505 Molecular spectroscopy (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	132
Course Co-ordinator	Prof D L Phillips, Chemistry		
Course Aim	This course provides a unifying treatment of the theories and applications of some important types of spectroscopy. Essential for graduate work in all branches of chemistry.		
Course Contents	Rotational (or Microwave) Spectroscopy, Vibrational Spectroscopy (both infrared and Raman), Electronic Spectroscopy.		
Learning Outcomes	On successful completion of this course, students should be able to: - Demonstrate knowledge and understanding of the molecular properties, Hamiltonians, spectroscopic transitions involved in the major types of spectroscopy examined in this course - Explain and describe examples of the applications of the types of spectroscopy discussed in the course - Compare the spectra and information that can be gained from the spectra for the different forms of spectroscopy examined in the course		
Pre-requisites	Pass in CHEM2503		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	24 hours lectures and 12 hours tutorials		

Assessment Method	One 2-hour examination (80% weighting) and continuous assessment (20% weighting)
Course Grade	A+ to F
Grade Descriptors	A B C D Fail
Textbooks	Banwell: Fundamentals of Molecular Spectroscopy (3rd ed.) G. Herzberg: Molecular Spectra and Structure Vol. I, II, and III Wilson, Decius and Cross: Molecular Vibrations Townes and Schawlow: Microwave
References	Banwell, Fundamentals of Molecular Spectroscopy (3rd ed) G. Herzberg, Molecular Spectra and Structure Vol. I, II, and III Wilson, Decius and Cross, Molecular Vibrations Townes and Schawlow, Microwave Spectroscopy Specialist texts for each section of the course

CHEM3506 Computational chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	60
Course Co-ordinator	Prof G H Chen, Chemistry		
Course Aim	This course covers topics in computational chemistry including first-principles methods and molecular dynamics methods. It is offered to undergraduate and postgraduate students interested in computational chemistry, computational physics and computational biology.		
Course Contents	Hartree-Fock molecular orbital method, density-functional theory, time-dependent methods, Basis sets, Force Fields, QM/MM method, free energy calculation, and computer-aided drug design.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic concepts of density-functional theory; - Understand the basic numerical techniques of molecular mechanics method and quantum mechanics/molecular mechanics method; - Employ the existing computational software to calculate the chemical, physical properties of various molecular systems include organic molecules, inorganic materials and biomolecules		
Pre-requisites	Pass in CHEM2503 or PHYS2323; and Not for students who have passed in CHEM6109, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 7 tutorials and 18 hours of computational lab		
Assessment Method	One 2-hour written examination (80% weighting) and continuous assessment (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Mastery of advanced knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Strong analytical and critical abilities and logical thinking, with strong ability to apply knowledge to practical problems in physical chemistry. B: Substantial command of a broad range of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of analytical and critical abilities and logical thinking, with ability to apply knowledge to practical problems in physical chemistry. C: Command of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of some analytical and critical abilities and logical thinking, with ability to apply knowledge to familiar problems in physical chemistry. D: Partial but limited command of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of some coherent analytical and critical abilities and logical thinking, with limited ability to apply knowledge to practical problems in physical chemistry. Fail: Little or no evidence of command of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Lack of analytical and critical abilities and logical thinking, with very little or no ability to apply knowledge to practical problems in physical chemistry.		
Textbooks	Attila Szabo & Neil S. Ostlund: Modern Quantum Chemistry (1st ed.) Robert G. Parr & Weitao Yang: Density-Functional Theory of Atoms and Molecules J.M. Haile: Molecular Dynamics Simulation Andrew R. Le		
Remarks	This course is equivalent to CHEM6109 (Computational Chemistry) for RPg.		

CHEM3507 Physical Chemistry II: Statistical Thermodynamics and Kinetic Theory (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	40

Course Co-ordinator	Dr H Hu, Chemistry
Course Aim	The course presents fundamental principles and topics on statistical thermodynamics and kinetic theory in order to provide a solid foundation for students intending to further their studies in physical chemistry and related fields.
Course Contents	Principles of Statistical Thermodynamics - Thermodynamic laws - Ensembles and partition functions: microcanonical, canonical and grand-canonical - Systems of independent molecules: ideal gas - Molecular degrees of freedom: translation, rotation, vibration, and electronic - Ideal gas mixture: chemical equilibrium, binding, and titration - Lattice statistics: Ising model and phase transition - Quantum statistics Chemical equilibrium and kinetic theory - Rate theory: collision theory, transition state theory
Learning Outcomes	On successful completion of this course, students should be able to: - understand and use the terminology and nomenclature in statistical thermodynamics and topics discussed in the course. - demonstrate knowledge and understanding of basic concepts in statistical thermodynamics -understand correlation between macroscopic observables and microscopic statistical model systems
Pre-requisites	Pass in CHEM2504; and Not for students who have already passed in CHEM2503 before.
Offer in 2012 - 2013	1st sem | **Examination** Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 lectures, 6 tutorials and 6 X 4 hours laboratory
Assessment Method	One 3-hour written examination (60% weighting). Continuous assessment of on-class quizzes and assignments (40%)
Course Grade	A+ to F
Grade Descriptors	A: Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry. B: Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge. C: General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations. D: Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge. Fail: Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.
Textbooks	T. L. Hill, An introduction to Statistical Thermodynamics P. Atkins, Physical Chemistry

CHEM3513 Advanced physical chemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	40
Course Co-ordinator	Prof G H Chen, Chemistry		
Course Aim	This course covers advanced topics in physical chemistry. It is offered for students majoring in physical chemistry and for students who are interested in postgraduate studies.		
Course Contents	The course includes topics in quantum chemistry, statistical thermodynamics, and molecular reaction dynamics. Variational method, Hartree-Fock method, ensembles, H-theorem, ratchet, molecular collisions, molecular beam experiments, reaction dynamics and other subjects are discussed.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the basic concepts of quantum chemistry, statistical thermodynamics and molecular dynamics; - Understand Hartree-Fock method, statistical ensembles, quantum statistics, H-theorem, and reaction dynamics; - Understand the elementary numerical procedures in Hartree-Fock and molecular mechanics methods		
Pre-requisites	Pass in CHEM2503; and Not for students who have already passed in CHEM3504 before.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	24 hours of lectures and12 tutorials		
Assessment Method	One 2-hour written examination (80% weighting) and continuous assessment (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Mastery of advanced knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Strong analytical and critical abilities and logical thinking, with strong ability to apply knowledge to practical problems in physical chemistry. B: Substantial command of a broad range of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of analytical and critical abilities and logical thinking, with ability to apply knowledge to practical problems in physical chemistry. C: Command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of some analytical and critical abilities and logical		

	study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.		
Course Contents	- Within the University: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor. - Outside the University: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - apply knowledge in their major study in solving practical problems in the work place - gain first hand work experience in the industry related to their major study		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give a presentation on their internship experience. Supervisors are required to assess the students based on their performance during the internship period (in the case of internships outside the university, the Internal Supervisor will assess the student based on the feedback by the External Supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge of the subject area to carry out the work required in the job or assigned by supervisor(s). Demonstrate effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written report and oral presentation, and evaluation by supervisor(s). Fail: Demonstrate very limited or no ability of applying knowledge of the subject area to carry out the work required in the job or assigned by supervisor(s). Demonstrate ineffective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written report and oral presentation, or evaluation by supervisor(s).		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

ENVS2008 Pollution (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	60
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	To introduce students to the principles of chemical and biological processes of pollution development and the impacts of pollution on environmental health. The course provides the basics for advanced courses on environmental toxicology, environmental monitoring and testing, environmental impact assessment, biodiversity, waste treatment and technologies, and environmental remediation.		
Course Contents	Types of pollution and associated characteristics; strategy of pollution reduction and treatment; chemical and biochemical processes involved in pollution development; indicators and (bio)markers of pollution status; pollution monitoring techniques and application; interactions between biological systems and pollutants in aquatic and terrestrial environments; chemical toxicity, exposures and risk assessment; pollution of air, water and soil; global climate change, and stratospheric-ozone depletion; water pollution and wastewater treatment; harmful algal blooms; solid and hazardous waste; soil pollution and remediation.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain types of pollution and their impact to the environment and population - explain mechanisms of pollution development - explain indicators and biomarkers of pollution and monitoring techniques of pollution - explain strategy of pollution reduction, treatment and remediation - explain chemical toxicity and risk assessment		
Pre-requisites	Pass in ENVS0001 or CHEM1009 or BIOL0126 or ENVS1002		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 36 hours of laboratory or literature review and tutorial; field trips		
Assessment Method	One 2-hour written examination (60% weighting) and student-based assessment (40% weighting). Student-based assessment includes laboratory report, review reports, group project and presentations or other forms.		
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. Demonstrate substantial grasp of the subject. Show evidence of analytical abilities and logical thinking, some evidence of		

	study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.		
Course Contents	- Within the University: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor. - Outside the University: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - apply knowledge in their major study in solving practical problems in the work place - gain first hand work experience in the industry related to their major study		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give a presentation on their internship experience. Supervisors are required to assess the students based on their performance during the internship period (in the case of internships outside the university, the Internal Supervisor will assess the student based on the feedback by the External Supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge of the subject area to carry out the work required in the job or assigned by supervisor(s). Demonstrate effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written report and oral presentation, and evaluation by supervisor(s). Fail: Demonstrate very limited or no ability of applying knowledge of the subject area to carry out the work required in the job or assigned by supervisor(s). Demonstrate ineffective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written report and oral presentation, or evaluation by supervisor(s).		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

ENVS2008 Pollution (6 credits)		**Academic Year**	**2012**
Offering Department	Chemistry	**Quota**	60
Course Co-ordinator	Dr W T Chan, Chemistry		
Course Aim	To introduce students to the principles of chemical and biological processes of pollution development and the impacts of pollution on environmental health. The course provides the basics for advanced courses on environmental toxicology, environmental monitoring and testing, environmental impact assessment, biodiversity, waste treatment and technologies, and environmental remediation.		
Course Contents	Types of pollution and associated characteristics; strategy of pollution reduction and treatment; chemical and biochemical processes involved in pollution development; indicators and (bio)markers of pollution status; pollution monitoring techniques and application; interactions between biological systems and pollutants in aquatic and terrestrial environments; chemical toxicity, exposures and risk assessment; pollution of air, water and soil; global climate change, and stratospheric-ozone depletion; water pollution and wastewater treatment; harmful algal blooms; solid and hazardous waste; soil pollution and remediation.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain types of pollution and their impact to the environment and population - explain mechanisms of pollution development - explain indicators and biomarkers of pollution and monitoring techniques of pollution - explain strategy of pollution reduction, treatment and remediation - explain chemical toxicity and risk assessment		
Pre-requisites	Pass in ENVS0001 or CHEM1009 or BIOL0126 or ENVS1002		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 lectures; 36 hours of laboratory or literature review and tutorial; field trips		
Assessment Method	One 2-hour written examination (60% weighting) and student-based assessment (40% weighting). Student-based assessment includes laboratory report, review reports, group project and presentations or other forms.		
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. Demonstrate substantial grasp of the subject. Show evidence of analytical abilities and logical thinking, some evidence of		

	B	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.
Textbooks	Marquita K. Hill: Understanding Environmental Pollution (Cambridge University Press, 2nd edition)	
Remarks	Offered from 2010-2011	

CSCI0001 Practical Chinese language course for science students (3 credits)		Academic Year	2012
Offering Department	Chinese	**Quota**	---
Course Co-ordinator	Mr K W Wong, Chinese		
Course Aim	This course aims to enhance students' competence in the use of Chinese in the workplace. It helps the students to master the standard formats and techniques of Chinese practical writings. In addition, topics addressing the style and rhetoric of reader-based scientific/technical writtings are included. Drilling practices are put in place to familiarize the students with the simplified Chinese characters frequently used in the workplace.		
Course Contents	- Fundamentals of modern Chinese - Traditional and simplified Chinese characters - Letters, memos, email and other brief messages - Office documents - Reader-based reports and proposals		
Learning Outcomes	On successful completion of the course, students should be able to: - Develop a balanced competency in modern Chinese and write well-formed sentences; - Develop a firm grasp of various writing and communication techniques for the use of practical Chinese; - Explore new tactics of communication, initiate discussions and debates and address new challenges; - Apply their disciplinary knowledge and their Chinese writing skills and professional presentation techniques analytically, critically and creatively in different social or professional discourses.		
Pre-requisites	NIL (This course is compulsory for all BSc students)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	12 hours of lectures; 7 hours of tutorials; 10 hours of group work; 12 hours of self study; 12 hours of homework and 8 hours of assessment (including preparation)		
Assessment Method	One 2-hour written examination (50% weighting); written project and web-based quiz (40% weighting); tutorial discussion (10% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: The student acquired a superb ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in all situations. B: The student acquired the ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in most situations. C: The student acquired adequate ability to achieve the intended learning outcomes of the course at low levels of learning (i.e. describe and apply the language techniques for effective communication) but not at high levels of learning (i.e. evaluate and synthesize the language techniques for effective communication). D: The student only has basic familiarity with the subject. Fail: The student has very limited familiarity with the subject.		
Textbooks	NIL		
References	周錫韋复：《中文應用寫作教程》（1996）汪麗炎：《漢語語法》（1998）香港城市大學語文學部：《中文傳意：基礎篇》（2001）香港城市大學語文學部：《中文傳意：寫作篇》（2001）		
Course Website	NIL		
Remarks	NIL		

CSCI2002 Advanced language studies in Chinese (3 credits)		Academic Year	2012
Offering Department	Chinese	**Quota**	---
Course Co-ordinator	Mr K W Wong, Chinese		
Course Aim	This course aims to further enhance the students' Chinese proficiency for effective communication in the fields of science and technology. It seeks to expand the students' vision of culture, history and literature; it also helps them to develop their sense of logic that is essential for text analysis, information collection, selection and sharing in the field of science. In response to the students' request, workshops on the use of Chinese for job applications are organized.		
Course Contents	- Proficiency in Chinese: diction, grammar and style; idioms and proverbs; quotable quotes - Information Management and Writing: text analysis; information collection and selection; information sharing in writing different genres - Professional Writings for Promotional Purposes: reader-centred and attention-getting writings; persuasive and rhetorical powers; readability formulas of professional writing - Culture, Language and Society: cultural dimensions of language, history and literature; politics in modern Chinese literature - Workshops on job applications in Chinese and advanced oral presentations		
Learning Outcomes	On successful completion of the course, the students should be able to: - Apply essential techniques of using Chinese for job applications - Draw on latest advances in Information and Communications Technology (ICT) to organize and present ideas in cyberspace - Demonstrate a high level of communicative competence in practical writings to accomplish different tasks - Employ a variety of linguistic and rhetorical means to achieve effective communication		
Pre-requisites	Pass in CSCI0001		
Offer in 2012 - 2013	1st sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	12 hours of lectures; 4 hours of tutorials; 3 hours of workshops; 12 hours of online learning; 15 hours of self study; 14 hours of homework		
Assessment Method	Written project and web-based quiz (60%); tutorial discussion (10%); workshop (30%)		
Course Grade	A+ to F		
Grade Descriptors	A: The student acquired a superb ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in all situations. B: The student acquired the ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in most situations. C: The student acquired adequate ability to achieve the intended learning outcomes of the course at low levels of learning (i.e. describe and apply the language techniques for effective communication) but not at high levels of learning (i.e. evaluate and synthesize the language techniques for effective communication). D: The student only has basic familiarity with the subject. Fail: The student has very limited familiarity with the subject.		
Textbooks	NIL		
References	黃健成：《寫作學教程》（2002）汪麗炎：《漢語寫作》（1998）雲桂賓：《語言行為與語言技能》（1998）譚學純等：《接受修辭學》（2000）顧興義：《應用語體學》（2000）		
Course Website	NIL		
Remarks	NIL		

EASC0003 Natural hazards and geological risk (6 credits)		Academic Year	2012
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr K H Lemke, Earth Sciences		
Course Aim	Natural hazards such as volcanoes, earthquakes, tsunamis, typhoons, floods, droughts, wildfires and landslides pose potential threats to an increasing number of humans. Climate change strongly influences the dynamics in hazard prone areas. This course aims to develop an awareness and understanding of the scale of these and other geological risks and their driving forces in order to develop suitable risk mitigation strategies.		
Course Contents	Earthquakes, tsunamis, volcanoes, typhoons, floods, droughts, landslides, wildfires, global catastrophes such as meteorite impact, pandemics, social impact and responses to risks, risk management.		
Learning Outcomes	On successful completion of this course, students should be able to: - To explain and highlight connections between specific geological environments and their associated hazard potential, to discuss the impact of select hazards on society. - To be able to explain relationships between basic physical properties of natural material and their macroscopic behaviour in solids, vapors and liquids. - To provide examples of how complex natural systems respond to man-made perturbations. - Give examples of how societies have (un)successfully dealt with hazard preparedness and mitigation.		
Pre-requisites	NIL		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures/seminars, up to 12 hours of group discussion. Field trip: A one-day field trip will be held to introduce participants to potential natural hazards in Hong Kong		
Assessment Method	One 2-hour written examination (50% weighting) and coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A B C D Fail		
Textbooks	Hyndman, D.: Natural Hazards & Disasters (Brooks/Cole, 2006, 2nd ed.)		

EASC0004 Early Life on Earth (6 credits)		Academic Year	2012
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr K H Lemke, Earth Sciences		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to -describe the basic physical and chemical conditions on the early Earth. -explain and describe the role of water and extreme geochemical conditions in the synthesis of biological molecules. -understand the role that different geological environments played during the origins of life. -identify challenges associated with each step in the origins of life. -investigate a current 'origins of life' topic.		
Pre-requisites	NIL		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of group presentations & seminars.		
Assessment Method	One 2-hour written examination (40% weighting) and coursework assessment: 1 midterms, group presentations, short essay (60% weighting).		
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. 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		

	C	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.
Textbooks	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)	

EASC0009 Peaceful use of nuclear technologies (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr S H Li, Earth Sciences		
Course Aim	To provide students with the science backgrounds and knowledge on application of nuclear technologies in daily life and to invoke an awareness of current applications of nuclear sciences by case studies.		
Course Contents	Man and radiation; principles of nuclear technology; case studies of nuclear techniques applied in arts, engineering, biological, physical and social sciences; radiation on earth and beyond; industrial application of nuclear techniques; nuclear techniques in medical study. Future development in nuclear technologies.		
Learning Outcomes	On successful completion of this course, students should be able to: - recognize the science fundamentals in nuclear technologies - explain and describe the principles of nuclear technologies applied. - have the awareness of current applications of nuclear sciences - demonstrate the knowledge and understanding of the underlying concepts associated with nuclear technologies.		
Pre-requisites	Not for students who have already passed in EASC0002 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours lectures and up to 24 hours of tutorials, library study, project work and practical / field work		
Assessment Method	One 2-hour written examination (50% weighting); Group activities and reports (30%); Individual project (20%)		
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.	
Textbooks	To be announced		
References	To be announced		

EASC0105 Earth through time (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Li, Earth Sciences		
Course Aim	To introduce the concept of geological time and basic geological principles. To provide an understanding of the fossil record and the integration of Earth Systems and plate tectonics. To gain an appreciation of our place in the Universe, an understanding of the evolution of Earth and life on Earth through time.		
Course Contents	Geological time, the origin of life, fossils and diversification of life through time, Important events in Earth history such as Snowball Earth, the Cambrian explosion of life, the Permian/Triassic mass extinction, the Cretaceous Tertiary extinction event, the origins of humans		
Learning Outcomes	On successful completion of this course, students should be able to: - Define basic geological principles - Explain critical geological relationships - Outline the history of the development of our planet - Interpret the geological record of evolution through time - Compare and contrast various hypotheses put forward to explain major events in Earth history		
Pre-requisites	NIL		

Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of labs, group discussion and class debate		
Assessment Method	One 2-hour written examination (50% weighting) and coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Lectures: 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. Apply highly effective organizational and presentational skills. Show strong interest in the taught topics; able to finish all the laboratory projects with great efforts and get insightful results. Able to answer most questions correctly and accurately. Laboratory: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective lab / fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Attend all the laboratory classes; showing strong ability in experiments, data processing and analysis; presenting lab reports with accurate language and correct results.		
	B: Lectures: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking. Apply effective organizational and presentational skills. Show interest in the taught topics; able to finish most the laboratory projects with efforts and get correct results. Able to answer most questions correctly. Laboratory: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. Attend all the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with correct results.		
	C: Lectures: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Apply moderately effective organizational and presentational skills. Show interest in the taught topics; able to finish 65% laboratory projects with correct results. Able to answer most questions correctly. Laboratory: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. Attend most of the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with mostly correct results.		
	D: Lectures: 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. Show some interest in the taught topics; able to finish 65% laboratory projects with generally correct results. Able to answer more than half of questions correctly. Laboratory: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Attend >50% of the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with acceptable results.		
	Fail: Lectures: 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. Does not show positive attitude in learning; not able to finish the laboratory project; not able to answer most of questions. Laboratory: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective. Miss more than half of lab work; not able to turn laboratory reports; cannot properly use computer and software for data processing; the lab report fail to give correct result.		
Textbooks	Stanley, S. M.: Earth System History (W F Freeman, 2005)		

EASC0116 Introduction to physical geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof L S Chan, Earth Sciences		
Course Aim	The course, intended for students taking their first course in earth science, provides a basic overview of the earth's structure, material and internal and external processes.		
Course Contents	Historical Development of Earth Sciences, Matter and Minerals, The Rock Cycle, Volcanic Activity, Sedimentation and Sedimentary Rocks, Metamorphism, Geologic Time, Dating Methods, Weathering and Soil, Landslides, Fluvial and Groundwater Processes, Plate Tectonics, Earthquakes, Crustal Deformation.		
Learning Outcomes	On successful completion of this course, students should be able to: - describe the basic concepts of physical geology - identify the most common minerals and rocks - acquire some field experience and learned to make observation and description - describe the relevance of physical geology to Hong Kong		
Pre-requisites	NIL		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 16 hours of lectures, 16 hours of practicals/tutorials and 2 days of field trips.		
Assessment Method	One 2-hour written examination (50%); Practical reports (25%); Project (25%) [requiring a report (15%) and a presentation (10%)]		
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.
Textbooks	Tarbuck E. J. and Lutgens F. K.: The Earth: An Introduction to Physical Geology (latest edition)	

EASC0117 Geological heritage of Hong Kong (3 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	45
Course Co-ordinator	Prof M F Zhou, Earth Sciences		
Course Aim	To give an overview of the geology of Hong Kong, potential geological resources for tourism and the role of geology in the development of Hong Kong's infrastructure.		
Course Contents	3 Lectures on general geology of Hong Kong, geology of Hong Kong's Country Parks, and aspects of geological knowledge pertaining to large scale construction project plus at least 3 weekend field trips (equivalent to a total of 24 hours) guided by experts to localities of geological interest.		
Learning Outcomes	On successful completion of this course, students should be able to: - acquire an appreciation of the processes leading to the formation of various landforms - understand of the major morphological features in Hong Kong - enhance the observation and analytical skills, and physical ability through participation in the field excursion		
Pre-requisites	NIL		
Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	N		
Teaching Hours	3 lectures (1 hour) & 3 weekend field trips		
Assessment Method	A 1-hour quiz (40%) and coursework assessment in form of participation (30%) and an essay (30%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Evidence of original thoughts, excellent field observation and ability to solve problems. Highly effective organization and presentation skills. B: Demonstrate substantial understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show analytical and critical abilities and logical thinking. Evidence of original thoughts and abilities of field observation. Effective organization and presentation skills. C: Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills. D: Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills. Fail: No or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.		
Textbooks	To be recommended		

EASC0118 Blue planet (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr P Bach, Earth Sciences		
Course Aim	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	The course will introduce and discuss the following topics: 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, Evolution and Extinction, Carbon Cycle), Concepts and Evolution of Dynamic Earth Systems, Human Interactions with Planet Earth (Earth Resources, Geological Hazards, Climate Change, Human Impact and Environmental Changes).		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the terminology and nomenclature appropriate to the introductory study of Earth Sciences - Demonstrate knowledge and understanding of the underlying concepts associated with the study of the Earth Systems and their dynamic interactive processes - Understand the extent and nature of global change and environmental concerns around us		
Pre-requisites	NIL		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 24 hours of practical work, student centered learning and one 2-day field camp		

Assessment Method	One 2-hour written examination (40% weighting); quizzes (10% weighting); laboratory reports (20% weighting) and field project report (30% weighting)
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.
Textbooks	Skinner B.J and Porter S.C.: The Blue Planet (1999) Murphy, B and Damian N.: Earth Science Today (1999)

EASC0122 Introduction to climate science (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Z Liu, Earth Sciences		
Course Aim	This course provides an introduction to the study of global climate systems and climate change. We study the controls of temporal and spatial variations in earth's climate and its histories of past climates preserved in the geological record. We look at modern research methods that are used in paleoclimatic and paleoenvironmental reconstructions.		
Course Contents	Global climatic systems, climate classification, natural variability of climate, physical causes for changes through geologic time, external and internal forcing mechanisms, solar orbital variations, major climatic events of the past and their effects on how our planet has developed, glacial and interglacial oscillations, predicting future global change.		
Learning Outcomes	On successful completion of this course, students should be able to: - Identify major aspects of climatology and approaches to climatological study, - explain the factors and physical processes controlling climate system, - understand the driving forces of Earth's climate change, - recognize the history of Earth's climate change		
Pre-requisites	NIL		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of labs, group discussion and class debate		
Assessment Method	One 2-hour written examination (50% weighting) and coursework assessment (50% weighting).		
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 critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but with some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.		
Textbooks	Ruddiman, W. F.: Earth's Climate Past and Future (W. F. Freeman, 2008, 2nd edition)		

	Robert V. Rohli and Anthony J. Vega: Climatology (Jones and Bartlett Publishers, 2008)

EASC1123 Planetary geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr M H Lee, Earth Sciences		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the basic features of our Solar System and its constituents. - Explain how this knowledge is acquired through observations and experiments. - Demonstrate knowledge and understanding of the key geological, physical and chemical processes governing the structure, formation and evolution of planetary bodies. - Compare and contrast our own planet Earth with other planetary bodies.		
Pre-requisites	E or above in AL Biol or Chem or Phys or Pure Math or Applied Math or Engineering Science		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of tutorials/practicals/seminars		
Assessment Method	One 2-hour written examination (50%); Coursework: Test (15%), Assignments (20%), Presentation (15%)		
Course Grade	A+ to F		
Grade Descriptors			
Textbooks	N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 2004)		

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.

EASC2004 Geophysics (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof L S Chan, Earth Sciences		
Course Aim	An overview of the geophysical characteristics and processes of the solid earth, the atmosphere and the oceans, as well as the methodologies for studying geophysical data.		
Course Contents	Introduction to Geophysics and Global Tectonics, Geomagnetic Field, Paleomagnetism, and Magnetostratigraphy, Earthquakes and earthquake measurements, Elastic Waves Theory and Density models, Seismicity and Tectonics, Reflection Seismology, Gravity of the Earth Gravity Anomalies and Isostasy, Thermal Properties of the Earth, Heat Flow and Heat Flow Anomalies, Dating Methods, Mantle and Mantle Processes, Core and Core Processes.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the approaches and methods geophysicists used to study the interior of the earth - Apply basic techniques in measurements of earthquakes and interpret a seismogram - Determine plate motion rates and understand the methods of paleomagnetism - Describe how density, pressure and temperature of the earth is determined		
Pre-requisites	Pass in EASC0116 or EASC0118		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 12 hours of labs and projects		
Assessment Method	One 2-hour written exam (50% weighting); practical reports (30%); interim assessment quizzes (20%)		
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.
Textbooks	To be prescribed	

EASC2005 Meteorology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Z Liu, Earth Sciences		
Course Aim	The course is a survey of the Earth's atmospheric structure and behavior, instrument of observation, weather elements and weather systems.		
Course Contents	Energy budget and radiative forcing, Adiabatic cooling and lapse rate, Moisture in the atmosphere, condensation and precipitation, Coriolis effects and pressure system, Air masses and frontal systems, Dynamics of the atmosphere, and Weather forecasting.		
Learning Outcomes	On successful completion of this course, students should be able to: - Define basic weather elements (temperature, humidity, winds etc.) - Recognise basic atmospheric processes (clouds, air masses, fronts and precipitation etc.) - Explain synoptic charts (weather maps) - Interpret HK weather (typhoons etc.)		
Pre-requisites	Pass in PHYS0610 or PHYS0629		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 12 hours of practical and project		
Assessment Method	One 2-hour written exam (50%), project (25%), assignment (25%).		
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. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.
Textbooks	C. Donald Ahrens, Meteorology Today, An Introduction to Weather, Climate and the Environment (Ninth edition, Thomson Brooks/Cole, 2008).	

EASC2108 Structural geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Dr J R Ali, Earth Sciences		
Course Aim	The course covers the mechanical properties of rocks and how they are deformed, geological maps and their use in interpreting structure.		
Course Contents	Stress-strain relationships; use of Mohr Circles, earthquakes, big faults, fault rocks; thrusts; folds; textures, kinematic indicators and strain analysis; Shear zones; extensional faulting - wilder concepts - basins; strike-slip faults; joints; deformation mechanisms. Practical classes will look at the use of stereonets; theoretical maps, real		

	maps and an introduction to stereograms. These sessions will be both quantitative and descriptive.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand how and why rocks deform. - Understand the terminology and nomenclature appropriate to Structural Geology. - Read a geological map and write an associated summary. - Understand the key structural geological features of the Hong Kong SAR, based on classroom and field studies.		
Pre-requisites	Pass in EASC0116 or EASC0118		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	10 lectures; six 2-hour laboratory sessions/five 1-day field classes in Hong Kong		
Assessment Method	One 2-hour written examination (50% weighting), a fieldwork and coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Thorough grasp of the subject; evidence of strong critical abilities and logical thinking; apply knowledge to a wide range of complex, familiar and unfamiliar situations; highly effective fieldwork skills and techniques; critical use of data and results to draw appropriate and insightful conclusions; integration of the full range of appropriate theories, principles, evidence and techniques. B: Substantial grasp of the subject; evidence of critical abilities and logical thinking; apply knowledge to familiar and some unfamiliar situations; effective fieldwork skills and techniques; correct use of data and results to draw appropriate conclusions; general integration of theories, principles, evidence and techniques. C: General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; apply knowledge to most familiar situations; moderately effective fieldwork skills and techniques; mostly correct but some erroneous use of data and results to draw appropriate conclusions; some partial integration of theories, principles, evidence and techniques. D: Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited ability to apply knowledge to solve problems; partially effective fieldwork skills and techniques; limited ability to use data and results to draw appropriate conclusions; limited integration of theories, principles, evidence and techniques. Fail: Little or no grasp of the knowledge and understanding of the subject; little or no evidence of critical abilities and coherent thinking; very little or no ability to apply knowledge to solve problems; minimally effective or ineffective fieldwork skills and techniques; misuse of data and results and/or unable to draw appropriate conclusions; little or no or inapt integration of theories, principles, evidence and techniques.		
Textbooks	Park, R. G.: Foundations of Structural Geology (Blackie, 1989) Davis, G. H. & Reynolds, S. J. 1996: Structural Geology of Rocks and Regions (Wiley, 2nd edition) Van der Pluijm, B. A., and Marshak, S.: Earth Structure: An Introduction to Structural Geology and Tectonics (WCB / McGraw-Hill, 1997)		

EASC2109 Igneous and metamorphic petrology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	30
Course Co-ordinator	Prof M Sun, Earth Sciences		
Course Aim	To provide a comprehensive coverage of the principles and techniques used in the study of igneous and metamorphic rocks and rock-forming processes.		
Course Contents	Petrogenesis; magmas and magmatic differentiation; igneous petrography; intrusive and extrusive suites; types of metamorphism; metamorphic zones and facies; metamorphic processes and reactions; metamorphic petrography; metamorphism in different tectonic settings; metamorphic P-T paths and their tectonic implications.		
Learning Outcomes	On successful completion of this course, students should be able to: - Identify major igneous and metamorphic rocks and their textures and structures in both hand specimens and under microscope; and - Demonstrate knowledge and understanding of magmatic and metamorphic processes and their cause-and-effect relationships with tectonic settings and crustal evolution.		
Pre-requisites	Pass in EASC0116 or EASC0118		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of in-class instruction, up to 36 hours of laboratory/field work		
Assessment Method	One 2-hour written examination (75% weighting) and coursework assessment (25% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply partially effective lab skills and techniques to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking, and ability to apply minimally effective or ineffective lab skills and techniques to solve problems. Misuse of data and results and/or unable to draw appropriate conclusions.		

	Organization and presentational skills are minimally effective or ineffective.
Textbooks	M.G. Best: Igneous and Metamorphic Petrology (Oxford Blackwell Science, 2003, 2nd ed.)
References	John D Winter: An Introduction to Igneous and Metamorphic Petrology (Prentice Hall, 2001)

EASC2112 Earth systems (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof J G Malpas, Earth Sciences		
Course Aim	To provide students who have a fundamental background of Earth Sciences with a more in depth appreciation of the Earth System and the interplay between its component parts, in order that they might appreciate some of global issues facing earth scientists, changes in the natural environment, and how informed decisions can be made on the future exploitation and preservation of the planet.		
Course Contents	What is Earth System Science?; the importance of interfaces, internal and external factors affecting the Earth System, particularly the atmosphere, biosphere and hydrosphere; biogeochemical cycles; global change and the threats to soil, water and air quality; energy and waste; socioeconomic factors and policy issues.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand the importance of interfaces between components of the Earth System - Demonstrate an appreciation of the natural and anthropogenic factors that cause global environmental change - Comment on the geological problems that face earth scientists in resource and waste management - Identify and rationalize issues associated with poorly defined problems through individual research, data collection, team discussion, and presentations etc		
Pre-requisites	Pass in EASC0118 or EASC0116 or EASC0105		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	Up to 48 hours of lectures, project work, debate and panel discussions, site visits		
Assessment Method	One 2-hour written examination (30% weighting) and coursework assessment including problem based learning sessions (70% weighting)		
Course Grade	A+ to F		
Grade Descriptors			
Textbooks	Reading provided and textbook to be announced		

Grade Descriptors:

A	The student should show a thorough mastery of the knowledge and skills necessary to attain all of the course outcomes, have an in-depth grasp of the subject, and provide evidence of strong analytical and logical thinking, where possible with original thought. Show outstanding and effective organizational and presentation skills, and the insightful use of data, literature reviews and other sources to undertake a high level of critical analysis and draw appropriate conclusions. Be able to integrate the full range of appropriate theories, principles, and evidence. Show an outstanding ability to lead others within a research team.
B	The student should show a substantial knowledge of a significant range of the skills necessary for attaining most, if not all, of the course outcomes, and have a substantial grasp of the subject. Show evidence of the ability to think critically and to have effective organizational and presentational skills and make critical use of relevant information from different sources, showing the ability to make comparisons between consequent interpretations. Be capable of the general integration of theories, principles and evidence. Show the ability to take a major role within a research team.
C	The student should have a general command of the knowledge, competencies and skills required for attaining the majority of the course outcomes, and a general grasp of the subject. Show some evidence of critical ability and logical thinking and moderately effective organizational and presentational skills. The student should be moderately effective in the use of data to draw appropriate conclusions, should be able to use relevant information from sources and able to make comparisons between different interpretations, through partial integration of theories, principles and evidence. To be able to participate confidently and actively within a research team.
D	The student should have a partial but limited command of the knowledge, competencies and skills necessary for attaining a number of the course learning outcomes, and a limited grasp of the subject. Show evidence of some analytical competence and critical thinking and at least marginally effective organizational and presentational skills. Have limited ability to use data and results to draw appropriate conclusions and use and reference a variety of sources mainly in summary rather than through analysis and comparison. To provide a minimum of input into the activities of a research team.
Fail	The student shows little or no evidence of knowledge and skills required for attaining even the minority of course learning outcomes, lacks an overall grasp of the subject area and shows an absence of analytical and critical thinking abilities. Shows little ability to a apply knowledge to solve problems and has poor and ineffective presentation and/or organizational skills. Shows little evidence of the integration of theories, principles and evidence. Shows little capability of usefully participating in a research team environment.

EASC2113 Sedimentology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr S C Chang, Earth Sciences		
Course Aim	The course deals with sedimentary rocks and processes, and the depositional environments in which sediments accumulate.		
Course Contents	Physical properties of sediments; processes of weathering, transportation and deposition; sedimentary rocks, carbonates, siliclastic sediments, and sandstone petrography; sedimentary environments and facies; sedimentation and tectonics.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the physical properties of sediments and sedimentary rocks - Contrast the processes involved in sediment transportation and deposition - Interpret ancient rock associations in terms of their depositional environment and likely tectonic setting		
Pre-requisites	Pass in EASC0105 or EASC0116 or EASC0118		
Offer in 2012 - 2013	2nd sem	**Examination**	May

Offer in 2013 - 2014	Y
Teaching Hours	2 lectures per week and 24 hours of laboratory/field work
Assessment Method	Grades will be based on midterm exam (30%), final exam (40%), one group presentation (10%) and lab reports (20%).
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical abilities and logical thinking, with evidence of original thought. Apply highly effective lab/fieldwork skills and techniques. Apply highly effective organizational and presentational skills. B: Demonstrate substantial grasp of the subject. Show strong analytical abilities and logical thinking. Apply effective lab/fieldwork skills and techniques. Apply highly effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Show some analytical abilities and logical thinking. Apply moderately effective lab/fieldwork skills and techniques. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp of the subject. Show some analytical abilities and logical thinking. Apply partially effective lab/fieldwork skills and techniques. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no grasp of the subject. Evidence of little or lack of analytical abilities and logical thinking. Apply minimally effective lab/fieldwork skills and techniques. Organization and presentational skills are ineffective.
Textbooks	Sedimentology and Stratigraphy (Second Edition), Gary Nichols

EASC2124 Geological maps and air photographs (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr P Bach, Earth Sciences		
Course Aim	This course is a hands-on field and class-based course that introduces basic geological field and mapping techniques and the use of geological equipment and air photographs as well as presenting an overview of the geology of Hong Kong.		
Course Contents	The course will introduce the following topics: Maps and map reading, map reference system, interpretation and use of air photographs and geological maps, construction of topographic and geological cross-sections; geological field techniques and equipment, field observation and description of rocks and outcrops.		
Learning Outcomes	On successful completion of this course, students should be able to: - read and comprehend a geological map and construct a geological cross section showing interpreted subsurface rocks and structures. - demonstrate techniques for basic field observations, measurements and identifications. - Create and interpret an internally consistent geological map from a set of collected field observations and data. - Develop skills in integrating geological field data in determining a geological history and writing a field report.		
Pre-requisites	Pass in EASC0118 or EASC0105 or EASC0116		
Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	12 hours of lectures, 12 hours of practical work, a compulsory 5-day field camp during the Reading week and a 1-day field trip (usually Saturday) in Hong Kong.		
Assessment Method	Coursework assessment in the form of geological field reports (70% weighting); one classroom test (20% weighting); and classroom exercises (10% weighting)		
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.		
Textbooks	Comprehensive Course Notes provided. John Barnes: Basic Geological Mapping (Wiley, 1995, 3rd edition)		
Remarks	Availability of offer in 2012-2013 to be confirmed.		

EASC2125 Global tectonics (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---

Course Co-ordinator	Prof J G Malpas, Earth Sciences
Course Aim	To provide students with an understanding of the driving forces of Earth processes and the global outcome of these processes through an examination of direct and indirect observations, the evolution of hypotheses, and critical thinking.
Course Contents	Driving forces of Earth processes; methods of investigation of large scale structures and processes; physical and structural properties of the planet; isostasy; continental drift; sea floor spreading; ocean ridges; transform faults; subduction zones; mountain belts and orogenesis; formation of continental crust; continental rifts and continental margins; sedimentary basins
Learning Outcomes	On successful completion of this course, students should be able to: - Have an appreciation of the Earth as a dynamic planet - Understand how energy release within the Earth is translated into geological processes - Appreciate the importance of a knowledge of the history of investigation of global scale tectonic processes - Distill of a wide range of data to differentiate competing geological theories - Produce concise written and oral summaries of literature research on specific topics in global dynamics
Pre-requisites	Pass in EASC0118 or EASC0105 or EASC0116
Offer in 2012 - 2013	2nd sem — **Examination**: May
Offer in 2013 - 2014	Y
Teaching Hours	Up to 48 hours of instruction including lectures, class seminars, class debates, essay presentation
Assessment Method	One 2-hour written examination (30% weighting) and coursework assessment including essays and seminars (70% weighting)
Course Grade	A+ to F
Grade Descriptors	**A**: The student should show a thorough mastery of the knowledge and skills necessary to attain all of the course outcomes, have an in-depth grasp of the subject, and provide evidence of strong analytical and logical thinking, where possible with original thought. Show outstanding and effective organizational and presentation skills, and the insightful use of data, literature reviews and other sources to undertake a high level of critical analysis and draw appropriate conclusions. Be able to integrate the full range of appropriate theories, principles, and evidence. **B**: The student should show a substantial knowledge of a significant range of the skills necessary for attaining most, if not all, of the course outcomes, and have a substantial grasp of the subject. Show evidence of the ability to think critically and to have effective organizational and presentational skills and make critical use of relevant information from different sources, showing the ability to make comparisons between consequent interpretations. Be capable of the general integration of theories, principles and evidence. **C**: The student should have a general command of the knowledge, competencies and skills required for attaining the majority of the course outcomes, and a general grasp of the subject. Show some evidence of critical ability and logical thinking and moderately effective organizational and presentational skills. The student should be moderately effective in the use of data to draw appropriate conclusions, should be able to use relevant information from sources and able to make comparisons between different interpretations, through partial integration of theories, principles and evidence. **D**: The student should have a partial but limited command of the knowledge, competencies and skills necessary for attaining a number of the course learning outcomes, and a limited grasp of the subject. Show evidence of some analytical competence and critical thinking and at least marginally effective organizational and presentational skills. Have limited ability to use data and results to draw appropriate conclusions and use and reference a variety of sources mainly in summary rather than through analysis and comparison. **Fail**: The student shows little or no evidence of knowledge and skills required for attaining even the minority of course learning outcomes, lacks an overall grasp of the subject area and shows an absence of analytical and critical thinking abilities. Shows little ability to a apply knowledge to solve problems and has poor and ineffective presentation and/or organizational skills. Shows little evidence of the integration of theories, principles and evidence.
Textbooks	Philip Kearey and Frederick J. Vine.: Global Tectonics (Blackwell Science, 1996, 2nd ed., 333pp)

EASC2126 Mineralogy and geochemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	30
Course Co-ordinator	Prof M Sun, Earth Sciences		
Course Aim	To provide the fundamentals and principles of geochemistry and mineralogy. It gives the basis for understanding the petrography of igneous, sedimentary and metamorphic rocks. To introduce geochemical principles, including trace elements and isotopes.		
Course Contents	Physical and optical properties of minerals; mineral structure; polarising microscope; characteristics of major rock forming minerals, trace elements; radiogenic and stable isotopes; low temperature geochemistry. Chemical differentiation of the earth; isotope geochemistry.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand basic knowledge of mineralogy and geochemistry, including the methodology used to identify rock-forming minerals according to their physical and optical properties, - understand mineral structure and crystallization. - understand the principles for trace element geochemistry and isotope geology and the applications of trace elements and isotopic ratios in tracing source and timing of geological processes.		
Pre-requisites	Pass in EASC0118 or EASC0105 or EASC0116		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of in-class instruction; up to 36 hours of practical work		
Assessment Method	One 2-hour written examination (75% weighting) and coursework assessment (25% weighting)		
Course Grade	A+ to F		
Grade Descriptors	**A**: Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective		

		organizational and presentational skills.
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply partially effective lab skills and techniques to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking, and ability to apply minimally effective or ineffective lab skills and techniques to solve problems. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Textbooks	C. Klein and C.S. Hurlbat: Manual of Mineralogy (Wiley, 1999, 1st ed.) W.D. Nesse: Introduction to Optical Mineralogy (Oxford University Press, 1998, 2nd ed). G. Faure: Principles and Applications of Geochemistry (Prentice Hall, 1998, 2nd ed).	

EASC2127 Global change: anthropogenic impact (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Z Liu, Earth Sciences		
Course Aim	This course will explore the role of humans in global change and the environmental responses to such changes. Causes and impacts of climate change will be discussed.		
Course Contents	Global warming, greenhouse gas emission, past climates, climatic and environmental changes vs. culture evolution, natural vs. anthropogenic climate change, model projections of future climate change, scientific uncertainty, impacts of climate change, including sea level, fresh water, food, ecosystems and human health		
Learning Outcomes	On successful completion of this course, students should be able to: - Recognise the complexity of global climate systems - Recognise the controversy of anthropogenic global warming - Identify modern environmental issues - Assess the credibility of various scientific arguments		
Pre-requisites	Pass in EASC0121 or EASC0105 or EASC0118		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		
Teaching Hours	24 hours of lectures, up to 24 hours of labs, group discussion and class debate.		
Assessment Method	One 2-hour written examination (50% weighting) and coursework assessment (50% weighting).		
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. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.	
	B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.	
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.	
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison.	
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.	
Textbooks	John Houghton, Global Warming, The Complete Briefing, Third Edition (Cambridge University Press, 2004)		
References	IPCC website: http://www.ipcc.ch/ipccreports/assessments-reports.htm		
Remarks	Offered every other year		

EASC2131 A cool world: ice ages and climate change (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr S H Li, Earth Sciences		
Course Aim	This course set out to provide students with an understanding of how dynamics Earth is and how it has changed		

	over the past 2.5 million years.		
Course Contents	The Quaternary Period comprises the last 2.6 million years of Earth history, an interval dominated by climate fluctuations and the waxing and waning of large northern hemisphere ice sheets. This course will cover the many types of geologic evidence, from glacial geomorphology to deep-sea geochemistry, that are used to reconstruct ocean and atmospheric conditions (e.g., temperature) through the Quaternary. We will also consider recent non-glacial deposits and landforms, including coastal features, but the general emphasis is on how the landscape has evolved within the context of Late Quaternary climate variability.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the earth climate change during the last 2.6 million years, - learn the methods of palaeo-environment reconstruction, - understand the impacts of past climate changes		
Pre-requisites	Pass in EASC0118 or EASC0121		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of labs, group discussion and class debate		
Assessment Method	One 2-hour written examination (50%); Project, fieldtrip and practical reports (50%)		
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.		
References	W F Ruddiman: Earth's Climate: Past and Future (Freeman, 2008, 2nd edition) D E Anderson, A S Goudie and A G Parker: Global Environments through the Quaternary (Oxford, 2007)		
Remarks	Offered every other year		

EASC2201 Hydrogeology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences		
Course Aim	To study the role of ground water in subsurface geological process and its environmental and geotechnical importance.		
Course Contents	The hydrologic cycle; physical properties of aquifer; groundwater flow; groundwater as a chemical agent; groundwater geology; groundwater and environmental management; groundwater as a resource; groundwater as a geotechnical and environmental problem.		
Learning Outcomes	On successful completion of this course, students should be able to: - Appreciate the importance of hydrogeology in geotechnical and environmental engineering - Understand basic concepts of hydrological cycle and water balance, and interaction between groundwater and surface water - Appreciate the close relationship between groundwater system and geology and topography - Understand basic concepts of aquifer and aquifer properties, hydraulic head, flow net, and basic principles of groundwater flow - Use basic field aquifer tests to estimate some important aquifer parameters		
Pre-requisites	Pass in EASC0116 or EASC0118		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	2 lectures per week for 12 weeks; 24 hours of laboratory/field work		
Assessment Method	One 2-hour written exam (70% weighting) and coursework (assignments, laboratory experiments and field testing) (30%)		
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 practical problems. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to most practical problems. Apply effective organizational and presentational skills. 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 some practical problems. Apply moderately effective organizational and presentational skills.		

	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve practical problems. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve practical problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	C. W. Fetter: Applied Hydrogeology (Prentice-Hall, 2001, 4th ed.)	

EASC2301 Field camps (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof J G Malpas, Earth Sciences		
Course Aim	The aims of a geological field camp are to provide 1) essential training and experience in geological mapping techniques and 2) opportunities to study at first-hand areas of particular geological interest and importance, especially outside Hong Kong.		
Course Contents	There are normally two field camps: one at the end of first year and one at the end of second year. These take the form of 10 days - 3 weeks residential camps in China or overseas, or in exceptional circumstances, in Hong Kong. Students will visit areas displaying exceptional geology and will undertake independent and group mapping and problem solving exercises.		
Learning Outcomes	On successful completion of this course, students should be able to: - Have an appreciation of the central importance of field studies to the Earth Sciences - Recognize a variety of rock types and their relationships with one another in any given field site - Appreciate various environmental aspects of a particular field location - Be competent in maintaining a field note book which records their observations and inferences - Construct a geological map based upon observed lithologies, structural relationships, relative ages and other relevant observations - Understand how to derive the geological history of an area through field investigations		
Pre-requisites	Pass in at least 42 credits of EASC courses.		
Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	A field camp comprises up to 30 days of group teaching in the field with related briefing and discussion sessions. Students will also be required to undertake a period of independent field mapping during this time.		
Assessment Method	Coursework assessment. A field report and/or completion of field assignments will be required for all field camps.		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Remarks	Duration: Generally up to 30 days at closure of 2nd semester of 1st & 2nd years students		

EASC2307 Directed studies in earth sciences (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof M Sun, Earth Sciences		
Course Aim	To enhance the student's knowledge of a particular topic and the student's self-directed learning and critical thinking skills.		
Course Contents	The student undertakes a self-managed study on a topic in earth sciences under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance the student's understanding of the subject. The project may not require an element of originality.		
Learning Outcomes	On successful completion of this course, students should be able to: - enhance the ability in self-learning, data-collection and analysis, critical thinking, doing independent research in earth sciences, - write scientific dissertation, and conduct oral presentation of the research results.		
Pre-requisites	Pass in at least 18 credits of EASC0XXX level or EASC1XXX level courses; and GPA of 2.5 or above.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		

Teaching Hours	No formal teaching; meetings to be arranged by the student and the supervisor. The student is expected to spend at least 50 hours on the project.
Assessment Method	Coursework (100%) in the form of a report with 6000-8000 words (exclusive of figures and references) and an oral presentation.
Course Grade	A+ to F
Grade Descriptors	**A**: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw insightful conclusions and solve problems. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable creative thinking and additional work beyond that is required in wider areas relevant to the topic.] **B**: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions to draw insightful conclusions and solve problems. Apply effective organizational and presentational skills. **C**: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. **D**: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. **Fail**: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Remarks	Consent of Major Coordinator is required for this course.

EASC3132 Earth resources (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Prof M F Zhou, Earth Sciences		
Course Aim	To provide students with knowledge about the classification of mineral deposits and their basic features; to understand the processes that lead to their formation; to gain hand on experience with mining procedures. In addition, students should gain knowledge about the world wide distributions of mineral and industrial resources.		
Course Contents	Concepts in mineral deposits and mining industrial; exploration and mining methods, classification of mineral deposit, mineral deposit models, magmatic oxide and sulfide deposits, skarn deposits, porphyre deposits, volcanogenic massive sulfide deposits, coal, oil and gas, resource evaluation.		
Learning Outcomes	On successful completion of this course, students should be able to: - understand the terminology and nomenclature in the mining industrial and mineral deposits - understand factors that are key to the formation of metallic and industrial resources - understand the controls of earth resources in a global scale - understand methods of exploration and exploitation for mineral deposits		
Pre-requisites	Pass in EASC0116 or EASC0118		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	2 lectures per week for 10 weeks; 20 hours of laboratory + 1 overseas camp		
Assessment Method	One 2-hour written examination (50% weighting), lab practicals (20% weighting) and oversea field trip (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	**A**: Demonstrate thorough understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Evidence of original thoughts, excellent field observation and ability to solve problems. Highly effective organization and presentation skills. **B**: Demonstrate substantial understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show analytical and critical abilities and logical thinking. Evidence of original thoughts and abilities of field observation. Effective organization and presentation skills. **C**: Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills. **D**: Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills. **Fail**: No or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.		
Textbooks	To be prescribed		

EASC3133 Applied geochemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	50
Course Co-ordinator	Dr K H Lemke, Earth Sciences		
Course Aim	To present key concepts of geochemistry and their application to environmental and Earth science problems.		

Course Contents	High temperature/pressure geochemistry, thermodynamics and kinetics of hydrothermal and geothermal systems, inorganic and organic geochemistry and the chemical interaction of minerals and aqueous inorganic, organic, and biochemical species in geochemical processes.
Learning Outcomes	On successful completion of this course, students should be able to: - understand how thermodynamic principles are applied to problems in aqueous systems at ambient and extreme conditions. -demonstrate knowledge of concepts and ideas of aqueous solutions. -explain principles of ion pairing, complex formation and mineral solubility and their relevance in metal transport and deposition during ore genesis. -understand how thermodynamic properties are applied to construct phase diagrams. - understand how experimental and theoretical methods are applied to gain insight into process in environmental and Earth sciences and how these relate to observable properties of solids, fluids and gases.
Pre-requisites	Pass in EASC2126
Offer in 2012 - 2013	1st sem **Examination** Dec
Offer in 2013 - 2014	Y
Teaching Hours	24 hours of lectures, up to 24 hours of labs, group discussions and seminars
Assessment Method	One 2-hour written examination (40% weighting) and coursework assessment: 2 midterms and student seminars (60% weighting)
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 in geochemistry, and at the same, can combine fundamental knowledge in geochemistry to understand the interactions among minerals, fluids and gases and how these processes impact fluxes of materials over geological time periods and on a global scale. Student shows the ability to apply highly effective organizat-ional 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 geochemistry, and at the same combine knowledge in geochemistry to understand material fluxes among minerals, fluids and gases over geological time periods and on a global scale. Student shows the ability to apply effective organizational and presentational skills.
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 geochemistry and how interactions among minerals, fluids and gases impact material fluxes on a global scale. 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 to understand key topics in geochemistry and limited capability to transfer this knowledge to geological phenomena. Student shows the ability to apply limited or barely effective organizational and presentational skills.
Fail	Student demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Shows very little or no ability to apply knowledge to understand basic topics related to the geochemistry and the application of these principles to geological problems. Organization and presentational skills are minimally effective or ineffective.

Textbooks	1) Barnes, H.L. Geochemistry of Hydrothermal Ore Deposits, (Wiley, 1997) 2) Stumm, W. Aquatic Chemistry, (Wiley, 1996)

EASC3134 Regional geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Dr J R Ali, Earth Sciences		
Course Aim	To examine the key events and phenomena associated with the the tectonic evolution of East-SE-South Asia, including that of Hong Kong.		
Course Contents	The tools used in deciphering dispersion and amalgamation of crustal plates, the Rodinia vs Gondwana origin models for the East Asian blocks; Construction of East Asia/SE Asia; India's collision with Eurasia and its regional effects; Mesozoic evolution of SE China, opening of the S China Sea; Geology of HK (stratigraphy, igneous rocks, structure and tectonic evolution); W Pacific marginal basins and Philippine Sea Plate; Offshore SE Asia; Japan and Taiwan.		
Learning Outcomes	On successful completion of this course, students should be able to: - Have an appreciation of the various "tools" that are a commonly used by earth scientists to decipher the evolution of a tectonically complicated region. - Have an awareness of the influential (and in some cases conflicting) models that have been proposed to explain how the collage of crustal elements that comprises East-SE-South Asia has been assembled over the last 250 million years, and where the "pieces" may have originated. - Carry out an in-depth scientific review (in this case a key geological issue associated with the region) of the literature (particularly hot-of-the-press journal papers and/or chapters in monographs) and to present the findings both orally at a seminar, and as an academic paper.		
Pre-requisites	Pass in EASC2108 and EASC2125		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	2 lectures per week for 10 weeks; 36 hours of library study + individual topic work		
Assessment Method	One 2-hour written examination (50% weighting); coursework assessment (50% weighting) consisting of library research, an oral presentation (and related abstract) and a related essay on a particular topic		
Course Grade	A+ to F		
Grade Descriptors			

	Thorough grasp of the subject; evidence of strong critical abilities and logical thinking; highly effective organizational and

	A	presentational skills; insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.
	B	Substantial grasp of the subject; evidence of critical abilities and logical thinking; effective organizational and presentational skills; critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.
	C	General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; moderately effective organizational and presentational skills; use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly.
	D	Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited or barely effective organizational and presentational skills; use and reference of several sources, but mainly through summary rather than analysis and comparison.
	Fail	Little or no grasp of the knowledge and understanding of the subject; little or no evidence of critical abilities and logical / coherent thinking; incoherent organization and poor presentational skills; limited use of secondary sources and no critical comparison of them.
Textbooks	To be prescribed	

EASC3202 Soil and rock mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences		
Course Aim	To provide a basic knowledge of soil and rock mechanics for those wishing to consider further studies on a career in engineering geology/geotechnics.		
Course Contents	Stress and strain; properties and classifications of soil and rock; clay minerals; pore pressure and effective stress; strength and failure criteria, initial stresses and their measurement; deformation; consolidation; planes of weakness in rocks; ground treatment methods.		
Learning Outcomes	On successful completion of this course, students should be able to: - Understand basic concepts of stress and strain, pore pressure and effective stress, strength and failure criteria - Understand basic properties and classifications of soil and rock - Appreciate the process of rock deformation and soil consolidation		
Pre-requisites	Pass in EASC2201, or already enrolled in this course		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	2 lectures per week for 12 weeks; 24 hours of laboratory/field work		
Assessment Method	One 2-hour written exam (70% weighting) and coursework (assignments and laboratory experiments) (30%)		
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. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	R. F. Craig: Soil Mechanics (Chapman & Hall, 6th ed.) R. E. Goodman: Introduction to Rock Mechanics (John Wiley & Sons, 1989)		

EASC3203 Engineering geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences		
Course Aim	To present some of the concepts and skills of importance in the profession of Engineering Geology and illustrate their use by case histories.		
Course Contents	Introduction to engineering design and the role of the Engineering Geologist; site investigation concepts and skills (air photo interpretation, soil and rock description, engineering geological plans, reporting); slopes, foundations. Case histories from Hong Kong.		
Learning Outcomes	On successful completion of this course, students should be able to: - Appreciate how civil engineering design is carried out and understand the work of the geologist on engineering projects, particularly the economic- and safety-critical duties. - Make simple engineering-geological models and understand how desk study, site reconnaissance survey and ground investigation design should be carried out. - Carry out simple air photo interpretation tasks and elementary soil and rock description and classification for engineering purposes. - Understand major types of slope failures and basic methods to control and mitigate landslides. - Carry out stability analyses using methods such as the limit equilibrium and stereographic projection method.		

Pre-requisites	Pass in EASC2201, or already enrolled in this course		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	2 lectures per week for 12 weeks; 20 hours of laboratory/field work		
Assessment Method	One 2-hour written exam (60% weighting) and coursework (assignment, field report) (40%)		
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 and skills to solve a wide range of complex, familiar and unfamiliar practical problems. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge and skills to solve familiar and some unfamiliar practical problems. 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 and skills to solve most familiar, but not unfamiliar, practical problems. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge and skills to solve familiar practical problems. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no 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 and skills to practical problems. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	Goodman, R. E.: Engineering Geology (Wiley, 1993)		

EASC3308 Earth sciences project (12 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof M Sun, Earth Sciences		
Course Aim	To enhance the student's knowledge, ability and interest in advanced studies in the Earth Sciences by providing the student with an opportunity to be engaged in an advanced research project.		
Course Contents	The student undertakes a research project in the form of a senior thesis under the supervision of a staff member. The project could be based on a particular component of a staff member's research or one proposed and designed by the student. The student must involve in the project in a non-trivial manner, and play a major role in the project formulation, data collection and analysis, and presentation. The project should contain an element of originality.		
Learning Outcomes	On successful completion of this course, students should be able to: - acquire first-hand research experience in earth sciences by doing an individual research project independently under the supervision of a supervisor. - select research topics, design research path, choose research technology, and more importantly use critical thinking. - enhance the ability in doing independent earth/environmental research with field/laboratory components.		
Pre-requisites	Pass in at least 18 credits of EASC2XXX level and EASC3XXX level courses; and GPA of 3.0 or above; and Major in Earth Sciences.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching; meetings to be arranged by student and supervisor. The student is expected to spend at least 100 hours on the project.		
Assessment Method	Coursework (100%) in the form of a report with 10000-15000 words (exclusive of figures and references) and an oral presentation.		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and creative thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of first-hand data and results to draw insightful conclusions and solve problems. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable creative thinking and additional work beyond that is required in wider areas relevant to the topic.] B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and creative thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of first-hand data of results to draw appropriate conclusions to draw insightful conclusions and solve problems. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and creative thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of first-hand data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use first-hand data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of first-hand data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Remarks	Consent of Major Coordinator is required for this course.		

EASC3988 Earth sciences internship (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof L S Chan, Earth Sciences		
Course Aim	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.		
Course Contents	(1) Within the university: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor. (2) Outside the university: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.		
Learning Outcomes	On successful completion of this course, students should be able to: - gain at least 4 weeks of work experience in a geosciences-related firm or the Government - acquire an understanding and appreciation of the real work environment - Have some experience with applying learned knowledge to solving real world problems		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	100% Internship performance		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

ENVS0001 Introduction to environmental science (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - explain and describe connections between the physical and biological stresses in the environment, discuss the impact of human society on the environment, - explain the concept of environmental sustainability, give examples of how society can adapt behavior to achieve sustainability and - compare different approaches to resolving specific problems presented in class.		
Pre-requisites	NIL		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of group discussion and class debate. Field Trip: A one-day field trip to		

	introduce participants to environmental issues within Hong Kong.
Assessment Method	One 2-hour written examination (50% weighting); course work assessment (50% weighting)
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.
Textbooks	Miller: Living in the Environment (Thomson, 2007, 15th ed.) Keller and Botkin: Essential Environmental Science (Wiley, 2008)

ENVS2004 Environment and society (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	This course introduces students the interface between human society and the earth systems, and helps students examine the relationship between them. The course emphasizes knowledge and understanding of how human society has interacted with the natural environment in the past and present, and the environmental problems that have arisen from human exploitation of the natural environment. Students will explore ways human society can deal with environmental problems and develop sustainable economies.		
Course Contents	The natural environment of East Asia Interconnections between human society and the environment Use and misuse of natural resources, and consequences Urbanization, economic growth and environmental degradation Sustainable natural resources management		
Learning Outcomes	On successful completion of this course, students should be able to: - demonstrate knowledge and critical understanding of the complexity and interconnectedness between human society and the natural environment, - understand the appropriate use or misuse of natural resources, and possible ways to achieve sustainable economies.		
Pre-requisites	Pass in ENVS0001 or EASC0118		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 8 hours of group discussion, 4 hours of project tutorials		
Assessment Method	One 2-hour written examination (60% weighting), project report (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery of the course material. Show strong ability for analytical, critical and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate highly effective organizational and presentational skills. B: Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of the course material and an ability to apply knowledge to most familiar situations. Show evidence of some critical and logical thinking abilities. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of course material with very little or no ability to apply knowledge to solve problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	Keller and Botkin: Essential Environmental Science (John Wiley & Sons, 2008) Kaufmann and Cleveland: Environmental Science (Amazon, 2008) Middleton N.: The Global Casino: An Introduction to Environmental Issues (Arnold, 1999)		
Remarks	Offered from 2010-2011		

ENVS2007 Natural hazards and mitigation (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	This course introduces students the mechanisms of major natural hazards including earthquake, storm and flood,		

	landslide and tsunami. The teaching emphasizes the fundamental concepts: natural hazards are not entirely natural, and understanding the frequency and processes of these hazards is essential in developing prevention, protection and mitigation measures. With case studies, the course will help students explore the political, economical and engineering means of dealing with natural hazards.		
Course Contents	Key characteristics of natural hazards Risk assessment and disaster management Climatic hazards and mitigation measures Geological hazards and mitigation measures Preparedness and responses to large natural disasters		
Learning Outcomes	On successful completion of this course, students should be able to: - demonstrate knowledge and critical understanding of the key characteristics of major natural hazards, the human aspects of the hazards, and technologies used to protect lives and properties.		
Pre-requisites	Pass in ENVS0001 or EASC0118 or EASC0003		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, 8 hours of group discussion, 4 hours of project tutorials		
Assessment Method	One 2-hour written examination (60% weighting), project report (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
A	Demonstrate thorough mastery of the course material. Show strong ability for analytical, critical and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate highly effective organizational and presentational skills.
B	Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational and presentational skills.
C	Demonstrate general but incomplete command of the course material and an ability to apply knowledge to most familiar situations. Show evidence of some critical and logical thinking abilities. Apply moderately effective organizational and presentational skills.
D	Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.
Fail	Demonstrate little or no evidence of command of course material with very little or no ability to apply knowledge to solve problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are minimally effective or ineffective.

Textbooks	Smith K.: Environmental Hazards: Assessing Risk and Reducing Disaster (Routledge, 2004) Bryant E.: Natural Hazards (Cambridge University Press, 2005) Hyndman and Hyndman: Natural Hazards and Diasters (Amazon, 2009)
Remarks	Offered from 2010-2011

ENVS2011 Directed studies in environmental science (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	To enhance students knowledge on a particular topic in environmental science and students self-directed learning and critical thinking skills.		
Course Contents	Students undertake extensive reading on a selected topic guided by a staff member. Reading should cover material beyond textbooks. Students are required to analyze the material read, formulate their own scientific argument, and present it in written form.		
Learning Outcomes	On successful completion of this course, students should be able to: - complete a research task independently in one or more of the four areas of the major, and - show competence in formulating their own scientific argument.		
Pre-requisites	Pass in any three of these courses: BIOL0126, CHEM0008, CHEM1009, EASC0118, ENVS0001, ENVS1002, PHYS0625, PHYS1417; and GPA 2.5 or above in Year 1 courses; and Major in Environmental Science.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal lecture is given. But advice will be given by a staff member on reading material on a chosen topic. Students are expected to work at least 50 hours on a project.		
Assessment Method	Coursework (100%) in the form of extended essay (5000 words excluding figures, references and appendix), and an oral presentation		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
A	Demonstrates excellent understanding of the topic, excellent development of argument, logical analysis and insight into the topic, with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]
B	Most aspects of the chosen topic were addressed and researched adequately. Demonstrates understanding of most key concepts, evidence of elementary analysis and development of argument. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations. Presented in adequate standard.
C	Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth.

	D	Demonstrate partial but limited grasp of the chosen topic, with retention of some relevant information. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited to draw appropriate conclusions from the sources.
	Fail	Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Remarks	Consent from major coordinator is required for this course.	

ENVS2013 Environmental Oceanography (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	To provide students with a thorough introduction to coastal and ocean processes with key questions to highlight the importance of the oceanographic processes to environmental conditions. To convey the basic science behind ocean-atmosphere and ocean-biosphere interactions and place it within the context of human's connectedness to the physical world.		
Course Contents	To provide a solid foundation of knowledge about the physical processes dictating the oceans movements and their impacts on the environment. The oceans take up 71% of earth's surface and contain 98% of the water. By looking at the structure of the atmosphere, thermodynamic principals and properties governing sea water, we will evaluate the critical roles the ocean plays in the environmental system including its influence on climate, coastal resources, and nutrient cycling. Case studies specifically examining changes in sea level rise, El Nino, and climate will be used to connect oceanographic principles to environmental problems.		
Learning Outcomes	On successful completion of this course, students should be able to: - Describe the major surface and deep currents of the ocean. - Identify and describe important processes in the ocean controlling large scale circulation and nutrient transport. - Describe sources and distribution of critical chemicals and sea water properties in the ocean. - Illustrate connections between physical ocean processes, climate systems and biological activity.		
Pre-requisites	Pass in EASC0118; and Not for students who have passed in EASC2129.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures, up to 24 hours of group discussion and class debate.		
Assessment Method	One two hour written examination (50% weighting), course work assessment (50% weighting).		
Course Grade	A+ to F		
Grade Descriptors			

Grade Descriptors	A	Demonstrate thorough mastery of the course material. Show strong ability for analytical, critical and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate highly effective organizational and presentational skills.
	B	Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete command of the course material and an ability to apply knowledge to most familiar situations. Show evidence of some critical and logical thinking abilities. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate little or no evidence of command of course material with very little or no ability to apply knowledge to solve problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Sea Water: Its Composition, Properties and Behaviour (Open University Press, 2nd edition) and Ocean Circulation (Open University Press, 2nd edition)	

ENVS3015 Environmental science project (12 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences		
Course Aim	To enhance students knowledge and research skills in advanced level of environmental science.		
Course Contents	Students undertake a research project in the form of an undergraduate dissertation under the supervision of a staff member. The project could be based on one of the four areas covered by the major and must show elements of interdisciplinary nature. The dissertation should show an element of originality and the research in a non-trivial manner.		
Learning Outcomes	On successful completion of this course, students should be able to: - complete a dissertation project of undergraduate level in one of the four areas of the major, and - show competence in formulation, data collection, analysis, and presentation of a research project.		
Pre-requisites	Pass in at least 18 credits of level 2 and level 3 courses in Environmental Science major; and Students must have a GPA of 3.0 or above; and Major in Environmental Science.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam

Offer in 2013 - 2014	Y
Teaching Hours	No formal lecture is given. Supervision meetings are to be arranged by the student and supervisor. The student is expected to spend at least 120 hours on the project.
Assessment Method	Coursework (100% weighting) in the form of an undergraduate dissertation with no more than 10000 words excluding figures, references and appendix, and an oral presentation.
Course Grade	A+ to F
Grade Descriptors	A: Demonstrates excellent understanding of the topic, excellent development of argument, logical analysis and insight into the topic, with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.] B: Most aspects of the chosen topic were addressed and researched adequately. Demonstrates understanding of most key concepts, evidence of elementary analysis and development of argument. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations. Presented in adequate standard. C: Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth. D: Demonstrate partial but limited grasp of the chosen topic, with retention of some relevant information. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited to draw appropriate conclusions from the sources. Fail: Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Remarks	Consent from major coordinator is required.

MATH0011 Numbers and patterns in nature and life (3 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	To explore the underlying mathematical structure in various topics in life and environmental sciences. Students from all disciplines will gain appreciation of mathematics as a potent tool for investigating and understanding nature and life.		
Course Contents	Topics, with their related mathematics, will be chosen from the following: bioinformatics, DNA sequencing and alignment, genetic inheritance, sustainable harvesting, spread and control of epidemics, population growth, evolution strategies, predator-prey dynamics, etc.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand and appreciate the underlying mathematical structure in some areas of life and environmental sciences; - apply basic mathematical modeling on some life science problems; - interpret and analyze mathematical data pertaining to life and environmental sciences.		
Pre-requisites	E or above in HKCEE Math		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	24 hours of lectures and student-centered learning		
Assessment Method	One 1-hour written examination (50% weighting) and continuous assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
Course Website	http://hkumath.hku.hk/course/MATH0011/		

MATH0201 Basic calculus (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr C W Wong, Mathematics		
Course Aim	To provide students with a basic background of calculus that can be applied in various disciplines, aiming at students not having done much mathematics beyond HKCEE mathematics. It can be followed by MATH1804 (University Mathematics A). Students with good grades in this course can also consider taking MATH1805 (University Mathematics B) or MATH1211 (Multivariable Calculus) as follow-up.		
Course Contents	- Sets, real numbers - Equations and inequalities - Functions, graphs and inverses - Exponential and logarithmic functions - Limits and continuity - Differentiation, chain rule, implicit differentiation - Higher order derivatives, curve sketching, maxima and minima - Definite and indefinite integrals, change of variables		
Learning Outcomes	On successful completion of the course, students should be able to: - understand and use the set notations in simple situations; - understand notions of functions and describe properties of a function appropriately; - grasp the intuitive concept of limits, and evaluate various limits of elementary functions; - examine the continuity of a function, and apply the intermediate value property and the extreme value property of continuous functions; - grasp the intuitive meanings of derivatives and integrals, evaluate derivatives and integrals of elementary functions; apply rules of differentiation and integration to handle more complex functions; - apply calculus to solve problems from geometry, economics, physical sciences, and other daily life disciplines.		
Pre-requisites	E or above in HKCEE Mathematics; and Not for students with E or above in HKCEE Add. Math or AS Math and Stat or AL Pure Math; and Not for students who have already passed in MATH0801 or before; and Not for students who have passed MATH0211, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning		

Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)	
Course Grade	A+ to F	
Grade Descriptors	A	Demonstrate excellent knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Always select appropriate theoretical and technical knowledge to solve a wide variety of problems. Evidence of ability to solve non – routine problems. Always manipulate mathematical expressions and calculate with high accuracy.
	B	Demonstrate a good knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Usually select appropriate theoretical and technical knowledge to solve a variety of problems. Evidence of ability to partly solve non – routine problems. Usually manipulate mathematical expressions and calculate with high accuracy.
	C	Demonstrate some knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Often select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Usually manipulate mathematical expressions and calculate with an adequate level of accuracy.
	D	Demonstrate minimum knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Sometimes select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Sometimes manipulate mathematical expressions and calculate with an adequate level of accuracy.
	Fail	Fail to demonstrate knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Very little evidence of ability to select appropriate theoretical and technical knowledge to solve problems. Manipulate mathematical expressions and calculate with substantial errors.
Textbooks	Raymond A Barnett et al: Calculus for Business, Economics, Life Sciences & Social Sciences (Pearson Education)	
Course Website	http://hkumath.hku.hk/course/MATH0201/	

MATH0211 Basic applicable mathematics (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr C W Wong, Mathematics		
Course Aim	This course aims at students not having done much mathematics beyond HKCEE mathematics, and provides them with a basic background of mathematics that is essential for concentrating in various disciplines which require moderate level mathematical tools. It can be followed by MATH1804 (University Mathematics A). Students with good grades in this course can also consider taking MATH1805 (University Mathematics B) or MATH1211 (Multivariable Calculus) as follow-up.		
Course Contents	- Set theory, permutation and combination - Functions, graphs and inverses - Limit and continuity - Differentiation - Higher order derivatives, curve sketching, maxima and minima - Partial differentiation - Sequences and series - Matrices and determinants - Definite and indefinite integrals, change of variables - Double integral - Numerical methods (bisection method, Newton's method etc)		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the concept of sets, permutations and combinations; - sketch and analyze the graphs of some basic functions, and understand the concept of limits and continuity of a function; - understand the concept of differentiation and solve applied optimization problems using differentiation; - compute basic indefinite/definite integrals; - understand the basic arithmetic of matrices and compute the determinants for 2x2 and 3x3 matrices; - compute partial derivatives for functions of two variables and double integrals using iterated integrals.		
Pre-requisites	(E or above in HKCEE Math or HKCEE Add. Math or AS Math & Stat); and Not for students with E or above in AL Pure Math; and Not for students who have already passed in MATH0801 before; and Not for students who have passed in MATH0201, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate excellent knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Always select appropriate theoretical and technical knowledge to solve a wide variety of problems. Evidence of ability to solve non – routine problems. Always manipulate mathematical expressions and calculate with high accuracy.	
	B	Demonstrate a good knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Usually select appropriate theoretical and technical knowledge to solve a variety of problems. Evidence of ability to partly solve non – routine problems. Usually manipulate mathematical expressions and calculate with high accuracy.	
	C	Demonstrate some knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Often select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Usually manipulate mathematical expressions and calculate with an adequate level of accuracy.	
	D	Demonstrate minimum knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Sometimes select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Sometimes manipulate mathematical expressions and calculate with an adequate level of accuracy.	
	Fail	Fail to demonstrate knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Very little evidence of ability to select appropriate theoretical and technical knowledge to solve problems. Manipulate mathematical expressions and calculate with substantial errors.	
Course Website	http://hkumath.hku.hk/course/MATH0211/		

MATH1001 Fundamental concepts of mathematics (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr Y M Chan, Mathematics		
Course Aim	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 followed by (or taken concurrently with) MATH1111, MATH1211 and other more advanced courses.		
Course Contents	- 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		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the definition of a set and apply set theory in simple daily life problems; - construct the truth table of a given statement; - apply different proof strategies (e.g. proof by contradiction and mathematical induction) in proving a mathematical statement; - demonstrate the basic properties of equivalence relations; - understand the definition of the limit of a sequence of real numbers; - demonstrate the operational properties of groups.		
Pre-requisites	E or above in HKCEE Add. Math or AS Math & Stat; and Not for students who have already passed in MATH1101 before; and Not for students who have already passed in MATH1201 before.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	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/MATH1001/		
Remarks	Students with good grades in HKCEE Math and have strong interests in math may also apply.		

MATH1111 Linear algebra (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr Y K Lau, Mathematics		
Course Aim	Linear algebra has wide applications to diverse areas in natural science, engineering, management, and social science. This course provides students an introduction to the theory and techniques of linear algebra. It is a foundation course for all mathematics students, to be followed by other more advanced courses in mathematics such as MATH2301, MATH2303.		
Course Contents	- Systems of linear equations - Row equivalence of matrices - Matrix algebra, determinant and rank of matrices - Vector spaces, subspaces, basis and dimension - Linear transformation, change of bases - Diagonalization of matrices		
Learning Outcomes	On successful completion of the course, students should be able to: - solve systems of linear equations, manipulate matrix algebra and determinants, apply row operations and elementary matrices; - understand the concept and basic structure of vector spaces, give examples and non-examples, explain the		

	concept of dimension, apply the dimension theorem (for the sum of two subspaces); - elucidate the nullspace, row space and column space of a matrix, apply the rank-nullity theorem; - give examples and non-examples of linear transformations, evaluate the matrix representations of a linear transformation; - evaluate eigenvalues and eigenvectors, evaluate algebraic multiplicity and geometric multiplicity, diagonalize a matrix.		
Pre-requisites	(E or above in (HKCEE Add. Math and AS Math & Stat); or E or above in AL Pure Math; or Pass in MATH1804); and Not for students who have already passed in MATH1101 before; and Not for students who have already passed in MATH1102 before.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning. Tutorials will also be arranged.		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate a thorough understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems. B: Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. C: Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. D: Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. Fail: Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.		
Textbooks	Steven J Leon: Linear Algebra with Applications (Pearson Prentice Hall)		
Course Website	http://hkumath.hku.hk/course/MATH1111/		
Remarks	Students with a good grade in MATH0201 or MATH0211 can also apply.		

MATH1211 Multivariable calculus (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr G Han, Mathematics		
Course Aim	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	- 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		
Learning Outcomes	On successful completion of the course, students should be able to: - understand and demonstrate the basic theory of calculus of functions in several real variables; - evaluate partial derivatives and multiple integrals; compute line integrals and surface integrals; - 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	(E or above in (HKCEE Add. Math and AS Math & Stat); or E or above in AL Pure Math; or Pass in MATH1804); and Not for students who have already passed in MATH1202 before.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning. Tutorials will also be arranged.		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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. Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their		

	B	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.
Textbooks	To be decided by the course instructors.	
References	Vector Calculus, 3rd Edition, by Susan Jane Colley, 2006, Pearson Prentice Hall	
Course Website	http://hkumath.hku.hk/course/MATH1211/	
Remarks	Students with good grades in MATH0201 or MATH0211 can also apply. Students are assumed to have mastered calculus of one-variable prior to taking this course.)	

MATH1611 Mathematical laboratory and modeling (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	20
Course Co-ordinator	Dr K H Chan, Mathematics		
Course Aim	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	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.		
Learning Outcomes	On successful completion of this course, students should be able to: - recognize the importance of numerical methods in mathematical modeling; - demonstrate basic algebraic and arithmetic computations in the Scilab environment; - write and interpret programs in Scilab programming language; - solve simple numerical problems using interactive Scilab commands; - solve moderately complicated numerical problems by writing Scilab programs.		
Pre-requisites	E or above in HKCEE Add. Math or AS Math & Stat		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting) based mainly on class tests and/or assignments.		
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.		
Textbooks	To be decided by the course instructor.		
References	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/MATH1611		

MATH1804 University mathematics A (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr Y M Chan, Mathematics		
Course Aim	To provide students with a more solid background of calculus of one variable and an introduction to calculus of several variables and matrices that can be applied in various disciplines, aiming at students having taken an elementary calculus course. It can be followed by MATH1211 (Multivariable Calculus).		
Course Contents	- Sets and functions		

	- Limits and continuity - Differentiation, application, Taylor approximation - Integration and techniques, improper integrals - Functions of several variables, partial differentiation - Maxima and minima, Lagrange multipliers - Double integrals - Matrices, systems of linear equations, inverses, determinants - Eigenvalues and eigenvectors		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the concept of sets and sketch the graphs of some basic functions; - understand the concept of limit and continuity; - understand various topics in differentiation such as the concept of a derivative, differentiability, the mean value theorem, simple curve sketching, Taylor polynomials and error estimation; - understand various topics in integration such as the fundamental theorem of calculus, techniques of integration and improper integrals; - understand various topics in matrices such as the basic arithmetic of matrices, determinants, systems of linear equations, eigenvalues and eigenvectors of 2x2 matrices; - understand various topics in functions of two variables including partial differentiation, the method of Lagrange multipliers and double integrals using iterated integrals.		
Pre-requisites	(E or above in HKCEE Add. Math or AS Math & Stat; or Pass in MATH0201 or MATH0211); and Not for students with E or above in AL Pure Math; and Not for students who have passed in MATH1805 or MATH1211, or have already enrolled in these courses; and Not for students who have already passed in MATH0802 or MATH1811 or MATH1812 before.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	Martin Anthony and Norman Biggs: Mathematics for Economics and Finance: Methods and Modelling (Cambridge University Press, 1996) Adrian Banner: The Calculus Lifesaver: All the Tools You Need to Excel at Calculus (Princeton University Press, 2007)		
Course Website	http://hkumath.hku.hk/course/MATH1804		

MATH1805 University mathematics B (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr C W Wong, Mathematics		
Course Aim	To provide students with a solid background of calculus of several variables and matrix algebra and an introduction to ordinary differential equations that can be applied in various disciplines. This course can be followed by other more advanced courses in mathematics.		
Course Contents	- Operations on matrices, systems of linear equations, determinants; eigenvalues and eigenvectors of matrices - Functions of several variables; partial differentiation; directional derivatives - Affine linear and quadratic functions; Taylor approximations - Maxima and minima; Lagrange multipliers - Double and triple integrals - Ordinary differential equations (ODE) of special types: separation of variables, first order linear ODE, homogeneous ODE, change of variables		
Learning Outcomes	On successful completion of the course, students should be able to: - determine the solutions of a system of linear equations by investigating its associated augmented matrix in (reduced) row echelon form, and apply these techniques to solve problems from economics, physical and social sciences; - diagonalize symmetric matrices, and demonstrate its applications in problems from economics, physical and social sciences, define and determine the definiteness of symmetric matrices; - understand the geometric meaning of partial derivatives, the first order and the second order approximation of multivariate functions; - optimize multivariate objective functions (with/without constraints); - evaluate integrals over curvilinear regions in the space; - solve simple first order ordinary differential equations.		
Pre-requisites	E or above in (HKCEE Add. Math and AS Math & Stat) or AL Pure Math; and		

	Not for students who have passed in MATH1211 or MATH1813, or have already enrolled in these courses; and Not for students who have already passed in MATH1202 or MATH1803 or MATH1811 or MATH1812 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate excellent knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Always select appropriate theoretical and technical knowledge to solve a wide variety of problems. Evidence of ability to solve non – routine problems. Always manipulate mathematical expressions and calculate with high accuracy. B: Demonstrate a good knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Usually select appropriate theoretical and technical knowledge to solve a variety of problems. Evidence of ability to partly solve non – routine problems. Usually manipulate mathematical expressions and calculate with high accuracy. C: Demonstrate some knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Often select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Usually manipulate mathematical expressions and calculate with an adequate level of accuracy. D: Demonstrate minimum knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Sometimes select appropriate theoretical and technical knowledge to solve or partly solve some routine problems. Sometimes manipulate mathematical expressions and calculate with an adequate level of accuracy. Fail: Fail to demonstrate knowledge and understanding of the key concepts and the theorems to achieve the learning outcomes. Very little evidence of ability to select appropriate theoretical and technical knowledge to solve problems. Manipulate mathematical expressions and calculate with substantial errors.		
Course Website	http://hkumath.hku.hk/course/MATH1805		
Remarks	Students with a good grade in MATH0201 or MATH0211 can also apply.		

MATH1813 Mathematical methods for actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr C W Wong, Mathematics		
Course Aim	To provide students with a background of calculus of several variables and matrix algebra and an introduction to ordinary differential equations that can be applied in actuarial science.		
Course Contents	- Matrices, systems of linear equations, determinants - Eigenvalues and eigenvectors, diagonalization of matrices - Quadratic functions and their standard forms - Functions of several variables; partial differentiation; directional derivatives - Taylor approximations - Maxima and minima; Lagrangian multipliers - Double and triple integrals - Simple differential equations		
Learning Outcomes	On successful completion of the course, students should be able to: - 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; - understand various topics in functions of several variables including partial differentiation, the Hessian test for local extrema, vector-valued functions, Jacobians, the method of Lagrange multipliers, double/triple integrals and the change of variable formula; - solve simple first and second order differential equations.		
Pre-requisites	E or above in AL Pure Math; and Not for students who have already passed in MATH1202 or MATH1803 before; and Not for students who have passed in MATH1211 or MATH1805, or have already enrolled in these courses.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	K Binmore and J Davies: Calculus - Concepts and Methods (Cambridge University Press, 2001)		

Course Website	http://hkumath.hku.hk/course/MATH1813/

MATH2001 Development of mathematical ideas (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	- To acquaint the students with the origin and growth of basic mathematical concepts - To assist the students to gain a deeper insight and broader view of mathematics as a discipline and human endeavour - To provide the students with an opportunity to write on and talk about mathematics, and to engage in independent study		
Course Contents	Selected topics in the development of mathematics from ancient to modern times depending on interest of the students and the lecturer, with attention paid to the evolvement of mathematical ideas and the process of mathematical thinking and problem solving.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand and describe the origin and development of basic mathematical concepts; - recognize and demonstrate the intellectual and the socio-cultural aspects of mathematics, and appreciate mathematics as both an academic discipline and a human endeavour; - discuss, argue, and write about the development of various mathematical concepts and ideas; - engage in independent study on a topic about the history or development of mathematics.		
Pre-requisites	Pass in MATH1111 and MATH1211		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) plus assessment of essays, talks and discussions (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Critical use of information from sources to draw appropriate and insightful conclusions. Actively engage in and contribute substantially and fruitfully to class discussions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Correct use of information from sources to draw appropriate conclusions. Good participation in class discussions with generally good contributions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Mostly correct but some erroneous use of information from sources to draw appropriate conclusions. Make some but not substantial fruitful contributions to class discussions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Limited ability to use information from sources to draw appropriate conclusions. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Misuse of information from sources and/or unable to draw appropriate conclusions. Make little or no meaningful contributions to class discussions. Organization and presentational skills are minimally effective or ineffective.		
Textbooks	To be decided by the course instructor.		
References	H. Eves and C.V. Newsom: An Introduction to the Foundations and Fundamental Concepts of Mathematics (Holt, Reinhart and Winston, 1958; 1990, 3rd edition) G. Polya: How to Solve It (Princeton University Press, 1971, 2nd edition) R. Laubenbacher and D. Pengelley: Mathematical Expeditions (Springer-Verlag, 1999) R. Calinger (ed.): Classic of Mathematics (Prentice Hall, preprinted 1995) C. Boyer: A History of Mathematics (Wiley, 1968; 1989, 2nd edition (with V.C. Merzbach)) V. Katz: A History of Mathematics (Harper Collins, 1993)		
Course Website	http://hkumath.hku.hk/course/MATH2001		

MATH2002 Mathematics seminar (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	12
Course Co-ordinator	Dr T W Ng, Mathematics		
Course Aim	This is a seminar style course intended for those who have very strong interests and good ability in mathematics. Students will be given book chapters and elementary research articles for private study and then make presentations in front of the whole class. Individual meetings with the instructors will be arranged prior to their presentations. Active participation in all the discussions is expected. The aim of the course is to let students learn how to initiate self/independent study in mathematics.		
Course Contents	Topics chosen by the instructors, including chapters from books and elementary research articles.		
Learning Outcomes	On successful completion of the course, students should be able to - initiate private independent study on some interesting mathematical topics.		
Pre-requisites	Pass in (MATH1001, MATH1111 and MATH1211); or Pass in (MATH1001 and MATH1111) and already enrolled in MATH1211; or Pass in MATH1001; and MATH1211) and already enrolled in MATH1111. (This course is for first year BSc students only.)		

Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	N		
Teaching Hours	Meeting of the whole class for two hours each teaching week, plus individual meetings with the instructors.		
Assessment Method	One 2-hour written examination (30%); coursework assessment (70%), based on class presentations, participation in discussions and a written report		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Actively engage in and contribute substantially and fruitfully to class discussions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Good participation in class discussions with generally good contributions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Make some but not substantial fruitful contributions to class discussions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Make little or no meaningful contributions to class discussions. Organization and presentational skills are minimally effective or ineffective.		
Course Website	http://hkumath.hku.hk/course/MATH2002/		
Remarks	Enrollment needs instructors' approval. This course is for first year BSc students only.		

MATH2201 Introduction to mathematical analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr J T Chan, Mathematics		
Course Aim	To introduce students to the basic ideas and techniques of mathematical analysis.		
Course Contents	- 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		
Learning Outcomes	On successful completion of the course, students should be able to: - comphrehend and use abstract mathematical arguments such as the epsilon-delta argument; - demonstrate convergence or non-convergence of a sequence/series using properties of convergent sequences/series; - elucidate important properties of continuous functions such as the extreme value theorem and the intermediate value theorem; - articulate the construction of the Riemann integral and its relation to differentiation.		
Pre-requisites	Pass in MATH1211 or MATH1805 or MATH1813		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	Elementary Analysis: The Theory of Calculus, by Kenneth A. Ross, 1980, Springer		
Course Website	http://hkumath.hku.hk/course/MATH2201/		

MATH2301 Algebra I (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr Y K Lau, Mathematics		
Course Aim	This course aims to present those fundamental topics and techniques of algebra that are finding wide applications in mathematics and the applied sciences. It is complete in itself, and may also be followed by Algebra II and Topics in Applied Discrete Mathematics.		
Course Contents	Groups: examples of groups, subgroups, cosets, Lagrange theorem, quotient groups, normal subgroups, group homomorphisms, direct product of groups, group actions. Rings: examples of rings, integral domains, ideals, fields of fractions, principal ideal domains, unique factorization domains. Fields: definition and examples of fields. Polynomials: polynomial rings in one variable over fields and over the integers, Gauss' lemma.		
Learning Outcomes	On successful completion of the course, students should be able to: - write down the precise definitions of the basic concepts in the "Course Conents"; - give examples for each of the concepts in the "Course Conents"; - understand basic properties of groups, rings, and fields.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1111 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	S. Lang: Undergraduate Algebra (Springer, 2004) J.B. Fraleigh: A First Course in Abstract Algebra (Addison-Wesley, 1989, 4th edition) I.N. Herstein: Abstract Algebra (Prentice-Hall, 1996) T.W. Hungerford: Abstract Algebra: An Introduction (Saunders College Publishing, 1990, 2nd edition)		
Course Website	http://hkumath.hku.hk/course/MATH2301/		

MATH2303 Matrix theory and its applications (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr Fullwood, Mathematics		
Course Aim	Matrix theory has a close connection with other mathematical subjects such as linear algebra, functional analysis, and combinatorics. It also plays an important role in the development of many subjects in science, engineering, and social sciences. In this course, students will be taught the fundamentals of matrix analysis and its application to various kinds of practical problems. Mathematical software may be used in the course, so that students can learn how to use the computer to solve matrix problems.		
Course Contents	Eigenvalues and eigenvectors: similarities, applications on difference equations and differential equations. Orthogonality: inner products and the induced norms, orthogonality of null spaces and column spaces, applications to over-or under-determined systems, least squares fit. Unitary, normal, and hermitian matrices: Schur's triangularization theorem. Variational description of eigenvalues: applications in optimization and in eigenvalue estimation. Singular value decomposition: polar decomposition, pseudo inverse, spectral norm of matrices, interlacing inequalities for singular values. Jordan form and applications.		
Learning Outcomes	On successful completion of the course, students should be able to: - have a good understanding on matrices, determinants, linear transformations, eigenvalues and eigenvectors; - understand the concept of similar matrices and the eigenvalue decomposition; - understand the concept of orthogonality; - understand the concept of unitary, normal, and Hermitian matrices; - find the singular value decomposition of a matrix and apply the theory of singular values to study polar decomposition, pseudo inverse and spectral norm of matrices; - understand the concept of the Jordan blocks, Jordan matrices and the Jordan canonical form of a matrix.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or MATH1111 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813		

Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting) based mainly on class tests and/or assignments.		
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.		
Textbooks	To be decided by the course instructor.		
References	Jack L. Goldberg: Matrix Theory with Applications (McGraw-Hill, 1991) Steven J. Leon: Linear Algebra with Applications (Macmillan, 1994, 4th edition) Chris Rorres & Howard Anton: Applications of Linear Algebra (Wiley, 1984, 3rd edition) Roger A. Horn & Charles R. Johnson: Matrix Analysis (Cambridge University Press, 1987) The Mathworks, Inc.: The Student Edition of Matlab (Version 4 for Microsoft Windows) (Prentice - Hall, 1995)		
Course Website	http://hkumath.hku.hk/course/MATH2303/		

MATH2304 Introduction to number theory (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof K M Tsang, Mathematics		
Course Aim	To provide students with basic concepts about numbers, their properties and the arithmetic of congruences. The prime numbers are the basic building blocks of all the natural numbers under multiplication. The interplay between the multiplicative and additive properties of prime numbers is particularly interesting. The course will study further properties and the distribution of the prime numbers, and some of the longstanding open problems concerning them. Important applications of number theory to modern cryptography will also be introduced.		
Course Contents	The course will begin with some basic notions in number theory, including divisibility, greatest common divisor, Euclidean algorithm, congruences, etc. It will then be followed by several fundamental theorems, such as Chinese reminder theorem, solutions of linear and polynomial congruences, Fermat's Little theorem, quadratic residues and the quadratic reciprocity law. Many well-known folklore open problems will also be introduced. Application of number theory to public key cryptography will be explained. Basic properties and some research on the prime numbers will be discussed. Then depending on the time remaining, the course will cover a selection of further topics, such as the prime number theorem, sum of squares, dirichlet's theorem on diophantine approximations, etc.		
Learning Outcomes	On successful completion of the course, students should be able to: - solve a system of linear congruences; - solve polynomial congruences; - determine the solubility of quadratic congruences by computation of Legendre symbols; - determine the existence of primitive roots and use them in solving some exponential congruences; - understand the prime number theorem; - understanding some longstanding problems in number theory.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1111 and MATH1211); and Pass in MATH2301, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate a thorough and coherent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing number theoretic problems, clearly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly. B: Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing number theoretic problems, but with some minor errors/inadequacies in arguments and being able to present coherent logical reasoning and carry out computations carefully without major errors. 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 weak and fragmentary argument and presentation, or with moderate computational errors. D: Demonstrate some superficial understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation, or with substantial computational errors. Demonstrates poor and inadequate understanding of the key concepts and ideas by not being able to identify appropriate		

	Fail	theorems or their applications, or not being able to complete the solution.
Textbooks	To be decided by the course instructor.	
References	David M. Burton, Elementary Number Theory, McGraw-Hill Higher Education, International Edition. T.M. Apostol, Introduction to Analytic Number Theory, Springer International Student Edition. A. Baker, A Concise Introduction to the Theory of Numbers, Cambridge University Press, Cambridge.	
Course Website	http://hkumath.hku.hk/course/MATH2304/	

MATH2401 Analysis I (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof W S Cheung, Mathematics		
Course Aim	This course extends to more general situations some basic results covered in Calculus and introduces some fundamental concepts which are essential for advanced studies in mathematical analysis.		
Course Contents	Basic properties of metric spaces; openness; closedness; interior point; adherent point; accumulation point; boundary point; compactness; completeness; continuity; connectedness; pathwise connectedness; uniform continuity; uniform convergence; Banach's fixed point theorem.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the basic features of mathematical analysis and point set topology (e.g., able to identify objects that are topological equivalent); - apply knowledge and skills acquired in mathematical analysis to analyze and handle novel situations in a critical way (e.g., able to determine whether a specific function is uniformly continuous); - think creatively and laterally to generate innovative examples and solutions to non-standard problems (e.g., able to provide counterexamples to inaccurate mathematical statements).		
Pre-requisites	Pass in (MATH1201 and MATH1202) or MATH1211 or MATH1803 or or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning. Tutorials will also be arranged if necessary.		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate a thorough understanding of all concepts and ideas by being able to draw complex connections among various concepts and apply the theorems through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation, and with some innovative approaches to solving problems. B: Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, reasoning, identifying the appropriate theorems, applications, or presentation. 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 acceptable argument and presentation. D: Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation. Fail: Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.		
Textbooks	To be decided by the course instructor.		
References	Apostol: Mathematical Analysis Rudin: Principles of Mathematical Analysis		
Course Website	http://hkumath.hku.hk/course/MATH2401/		

MATH2402 Analysis II (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr P P W Wong, Mathematics		
Course Aim	This course gives a comprehensive and rigorous treatment on calculus of several variables, and a modern treatment of integration theory in the language of differential forms which is essential for more advanced studies in analysis and geometry.		
Course Contents	Differentiation of functions of several variables: partial derivatives, differential, differentiability, inverse function theorem, implicit function theorem, free extremum problems, constrained extremum problem, method of Lagrange multipliers Integration in R^n: Basic definitions, measure zero and content zero sets, integrability, Fubini's Theorem, partition of unity, change of variables Integration on chains: tensors, alternating tensors, vector fields, differential forms, Poincare Lemma, Stokes' Theorem		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the modern language of mathematical analysis and geometry (e.g., able to manipulate differential forms); - apply knowledge and skills acquired in mathematical analysis to analyze and handle novel situations in a critical way (e.g., able to determine the differentiability and integrability of specific functions);		

	- think creatively and laterally to generate innovative solutions to novel problems (e.g., able to do integration of specific functions on chains).		
Pre-requisites	Pass in ((MATH1201 and MATH1202) and (MATH1101 or MATH1102)) or (MATH1111 and MATH1211) or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course; and Pass in MATH2401, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	Apostol: Mathematical Analysis Munkres: Analysis on Manifolds Rudin: Principles of Mathematical Analysis Spivak: Calculus on Manifolds		
Course Website	http://hkumath.hku.hk/course/MATH2402/		

MATH2403 Functions of a complex variable (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof N Mok, Mathematics		
Course Aim	This course is indispensable for studies in higher mathematical analysis and the more theoretical aspects of physics. In this course, the students are introduced to the fundamental concepts and properties of analytic functions and are shown how to look at analyticity from different points of view. At the same time, the techniques of solving problems without losing sight of the geometric picture are emphasized.		
Course Contents	Complex number system. Analytic functions and elementary functions. The Cauchy-Riemann equations. Cauchy's theorem and its applications. Taylor's series. Laurent's series. Zeros, singularities and poles. The Residue Theorem and its applications.		
Learning Outcomes	On successful completion of the course, students should be able to: - recognize the theory of functions of a complex variable as a rigorous and foundational subject in mathematics; - grasp the techniques from Cauchy-Riemann equations, power series expansion and Cauchy integral formulas to study analytic functions from different perspectives; - compute contour integrals by calculating residues; - apply such techniques to determine improper integrals such as those for certain rational functions on the real line.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813; and Pass in MATH2201, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.
Textbooks	To be decided by the course instructor.	
References	E.C. Titchmarsh: The Theory of Functions (OUP) L.V. Ahlfors: Complex Analysis (McGraw-Hill, 3rd edition) J. Bak & D.J. Newman: Complex Analysis, Undergraduate Texts in Mathematics (Springer-Verlag) K. Kodaira: Introduction to Complex Analysis (Cambridge)	
Course Website	http://hkumath.hku.hk/course/MATH2403/	

MATH2405 Differential equations (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof J H Lu, Mathematics		
Course Aim	The standard topics in the wide field of ordinary differential equations (ODE) included in this course are of importance to students of mathematics and sciences. Our emphasis is on principles rather than routine calculations and our approach is a compromise between diversity and depth.		
Course Contents	Review of elementary differential equations. Existence and uniqueness theorems. Second order differential equations, Wronskian, variation of parameters. Power series method, Legendre polynomials, Bessel functions. The Laplace transform. Linear systems, autonomous systems. Qualitative properties of solutions.		
Learning Outcomes	On successful completion of the course, students should be able to: - solve simple first order and second order (linear or nonlinear) ODEs by various techniques, including auxiliary equations, variation of parameters, Laplace transform, and series method; - solve systems of first order linear ODEs with constant coefficients, of which the number of equations and the number of unknown functions are no more than three; - discuss qualitatively the solutions of nonlinear ODEs or systems of nonlinear ODEs by studying their linear approximations or their phase diagrams; - apply the theory of differential equations to study quantitatively/qualitatively problems from physical and life sciences.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or MATH1111 or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1811 or MATH1812 or MATH1813		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	W.E. Boyce and R.C. DiPrima: Elementary Differential Equations and Boundary Value Problems (John Wiley, 6th edition) E.A. Coddington: An Introduction to Ordinary Differential Equations (Prentice-Hall) G.F. Simmons: Differential Equations with Applications and Historical Notes (McGraw-Hill)		
Course Website	http://hkumath.hku.hk/course/MATH2405/		

MATH2408 Computational methods and differential equations with applications (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr W K Ching, Mathematics		
Course Aim	This course covers topics in the fields of differential equations and numerical analysis which are of importance to sciences students. The emphasis is practical applications of basic principles.		
Course Contents	Numerical differentiation and integration. Solution of nonlinear systems of equations. Elementary differential equations. Power series method. Numerical solutions of ordinary and partial differential equations. Numerical		

	solutions of systems of first-order ordinary differential equations.
Learning Outcomes	On successful completion of the course, students should be able to: - construct and implement numerical methods for numerical integration and differentiation, and the solution of nonlinear system of equations; - explain mathematical ideas of numerical methods in solving ordinary and partial differential equations; - construct one-step and linear multistep methods for the numerical solution of initial-value problems for ordinary differential equations and systems of such equations and analyze their stability and accuracy properties; - construct finite difference methods for the numerical solution of partial differential equations and analyze their stability and accuracy properties; - implement numerical methods for solving initial and boundary value problems by software packages like Scilab.
Pre-requisites	Pass in MATH1111 or MATH1211 or MATH1611 or MATH1803 or MATH1804 or MATH1805 or MATH1813
Offer in 2012 - 2013	2nd sem — **Examination**: May
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and student-centered learning
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)
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 computational 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 computational methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and computational 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 computational 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 computational 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 computational methods or their applications, or not being able to complete the solution.
Textbooks	To be decided by the course instructor.
References	D.F. Parkhurst: Introduction to Applied Mathematics for Environmental Science (Springer) E.A. Coddington: An Introduction to Ordinary Differential Equations (Prentice-Hall) A. Ralston and P. Rabinowitz: A First Course in Numerical Analysis (McGraw-Hill)
Course Website	http://hkumath.hku.hk/course/MATH2408/

MATH2600 Discrete mathematics (6 credits)	**Academic Year**: 2012
Offering Department	Mathematics — **Quota**: ---
Course Co-ordinator	Prof W Zang, Mathematics
Course Aim	To introduce students to the basic ideas and techniques of discrete mathematics.
Course Contents	- Counting: combinations, permutations, pigeonhole principle, inclusion-exclusion, recurrence relations, and generating functions - Graph theory: paths, circuits, trees, connectivity, planarity, etc. - Applications of counting techniques and graph theory
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the basic ideas and techniques of discrete mathematics; - solve various real-world problems by using counting techniques and graph theory; - develop their ability to read, comprehend, and create mathematical arguments.
Pre-requisites	Pass in any two of MATH1XXX level or MATH2XXX or MATH3XXX level courses; and Not for students who have already passed MATH1800 before.
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and student-centered learning
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)
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.
Textbooks	K H Rosen: Discrete Mathematics and its Applications (McGraw-Hill, 2007)	
Course Website	http://hkumath.hku.hk/course/MATH2600/	

MATH2601 Numerical analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr K H Chan, Mathematics		
Course Aim	This course covers both the theoretical and practical aspects of numerical analysis. Emphasis will be on basic principles and numerical methods of solution, using high speed computers.		
Course Contents	Round off errors. Polynomial interpolation. Solution of equations of one variable. Direct and iterative methods for solving linear systems. Numerical differentiation and integration. Simple initial value problems.		
Learning Outcomes	On successful completion of the course, students should be able to: - construct and implement algorithms to find the zeros of functions, apply the bisection, Newton, secant and fixed point iteration methods; - construct and implement Newton's method to find the roots of a system of nonlinear equations; - construct interpolation polynomials in Lagrange, Newton, Hermit and spline forms; - apply the basic numerical integration and differentiation methods; - solve initial value problems using Taylor series and Runge-Kutta methods of varying orders; - use software package such as Scilab to solve numerical problems.		
Pre-requisites	Pass in MATH1201 and (MATH1101 or MATH1102 or MATH1202); or Pass in MATH1202 and (MATH1101 or MATH1102 or MATH1201); or Pass in (MATH1811 or MATH1803) or (MATH1812 or MATH1803); or Pass in MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A	Demonstrate an excellent understanding of key concepts and methods by being able to identify the appropriate theorems/algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out numerical procedures carefully and correctly, and with some innovative approaches to solving problems.	
	B	Demonstrate a good understanding of key concepts and methods by being able to identify the appropriate theorems/algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate algorithms or their applications or with some minor computational errors.	
	C	Demonstrate an acceptable understanding of key concepts and methods by being able to correctly identify appropriate theorems/algorithms, but with some inadequacies in applying the theorems/methods through incorrectly analysing problems with poor argument and presentation or with a number of minor computational errors.	
	D	Demonstrate some understanding of key concepts and methods by being able to correctly identify appropriate theorems/algorithms, but with substantial inadequacies in applying the theorems/methods through incorrectly analysing problems with poor argument and presentation or with substantial computational errors.	
	Fail	Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems/algorithms or their applications, or not being able to complete the solution.	
Textbooks	To be decided by the course instructor.		
References	Instructor's Lecture Notes A. Ralston and P. Rabinowitz: A First Course in Numerical Analysis (McGraw-Hill) K. E. Atkinson: An Introduction to Numerical Analysis (Wiley, 1989)		
Course Website	http://hkumath.hku.hk/course/MATH2601/		
Remarks	Knowledge of a programming language is required.		

MATH2603 Probability theory (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr J Tsai, Mathematics		
Course Aim	The emphasis of this course will be on probability models and their applications. The primary aim is to elucidate the fundamental principles of probability theory through examples and to develop the ability of the students to apply what they have learned from this course to widely divergent concrete problems.		
Course Contents	- Basic probability theory and decision theory: discrete probability distributions, continuous probability distributions, conditional probability, expectation, variance, moment generating function, limit theorems, Bayes' Theorem, decision analysis, decision tree method - Poisson process and reliability theory: exponential distribution, Markov property, Poisson process, concepts of reliability, components in series, components in parallel, maintenance models - Markov chain theory: concepts of states and transition probability, irreducibility, stationary distribution, applications in marketing and genetic problems, branching process, other Markov models - Inventory theory: concepts of EOQ, lead time effect, newsboy models, stochastic inventory systems		
Learning Outcomes	On successful completion of the course, students should be able to:		

	- understand the fundamental principles of probability theory; - explain the typical proofs and computational techniques in probability theory and apply them to concrete problems; - demonstrate knowledge and understanding of various types of probability models.
Pre-requisites	Pass in (MATH0801 and MATH0802) or (MATH1201 and MATH1202) or (MATH1811 and MATH1812) or MATH1111 or MATH1211 or MATH1803 or MATH1804 or MATH1805 or MATH1813
Offer in 2012 - 2013	1st sem — **Examination** Dec
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and student-centered learning
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)
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.
Textbooks	To be decided by the course instructor.
References	S. M. Ross: Introduction to Probability Models (Academic Press, 2007, 9th ed.)
Course Website	http://hkumath.hku.hk/course/MATH2603/

MATH2901 Operations research I (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof S C K Chu, Mathematics		
Course Aim	The objective is to provide a fundamental account of the basic results and techniques of linear programming (LP) and its related topics in operations research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on network models, as essential concept and background for more advanced studies in operations research.		
Course Contents	Linear Programming. Matrix game. Goal programming.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the fundamental concept and approach of linear programming appropriate to the further study of operations research; - demonstrate knowledge and understanding of the underlying techniques of the Simplex Method and its extensions such as the revised Simplex and dual Simplex algorithms; - understand and apply the theory of LP duality such as in the theory and computations of matrix games.		
Pre-requisites	Pass in MATH1101 and (MATH1102 or MATH1201 or MATH1202); or Pass in MATH1102 and (MATH1101 or MATH1201 or MATH1202); or Pass in MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	The course will follow the original assesseement method of 50% course work and 50% final exam, as long as the final exam can be scheduled in the original assessment period. Otherwise, the final exam will be replaced by a 2-hour assessment paper (in-class) at the end of the teaching period.		
Course Grade	A+ to F		
Grade Descriptors	**A**: Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches. **B**: Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. **C**: Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. **D**: Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. **Fail**: Demonstrates poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.		

Textbooks	To be decided by the course instructor.
References	J.P. Ignizio and T.M. Cavalier: Linear Programming (Prentice-Hall International, 1994) J.P. Ignizio: Goal Programming and Extensions (Lexington Books, 1976) H.A. Taha: Operations Research (Prentice-Hall International, 7/e 2003) P.R. Thie: An Introduction to Linear Programming and Game Theory (Wiley 2/e 1988) W.L. Winston: Introduction to Mathematical Programming (Duxbury 4/e 2003)
Course Website	http://hkumath.hku.hk/course/MATH2901/

MATH2904 Introduction to optimization (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof W Zang, Mathematics		
Course Aim	This course introduces students to the theory and techniques of optimization, aiming at preparing them for further studies in operations research, mathematical economics and related subject areas.		
Course Contents	Unconstrained and constrained optimization, necessary conditions and sufficient conditions for optimality, convexity, duality. Algorithms and numerical examples.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the basic theory and techniques of optimization; - solve various optimization problems encountered in practice; - understand the connection between the purely analytical character of an optimization problem and the behavior of algorithms for solving it.		
Pre-requisites	Pass in ((MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2201, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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.

References	Instructor's lecture notes
Course Website	http://hkumath.hku.hk/course/MATH2904/

MATH2905 Queueing theory and simulation (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	This course introduces students to the models and theory of queueing system, as well as the technique of simulation as a practical tool of analysis.		
Course Contents	Markov, birth-and-death, and Poisson processes, exponential models. Markovian queueing networks. Imbedded Markov-chain queueing models. Simulation of queueing models and discrete-event systems.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the terminology and nomenclature appropriate to queueing theory; - demonstrate knowledge and understanding of various queueing models; - formulate concrete problems using queueing theoretical approaches; - become familiar with fundamental principles of simulation and compare different simulation techniques.		
Pre-requisites	Pass in (STAT1301 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		

Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate an excellent understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches. B: Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. 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.		
Textbooks	To be decided by the course instructor.		
References	R.B. Cooper: Introduction to Queueing Theory (Edward Arnold, 1981, 2nd ed.) S.M. Ross: Introduction to Probability Models (Academic Press, 1993, 5th ed.) S.M. Ross: A Course in Simulation (Macmillan, 1991)		
Course Website	http://hkumath.hku.hk/course/MATH2905/		

MATH2906 Financial calculus (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr S P Yung, Mathematics		
Course Aim	This course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks from an applied mathematician's point of view. Stochastic calculus and solution methods will be introduced.		
Course Contents	An introduction to financial instruments: stocks, bonds, foreign exchange, options, forward and future contracts. Asset pricing: risk neutral relationship, no arbitrage principle. Brownian motion, stochastic calculus, Ito's Lemma, Black-Scholes model and its pricing partial differential equation. Variations on the Black-Scholes model: American options, path dependent options. Numerical binomial tree method.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the terminology and nature of bonds, interest rates, forwards, futures, stocks, options, and the no-arbitrage-principle; - demonstrate knowledge on using binomial tree models to find option prices via the risk-neutral concept; - describe basic properties of a Brownian motion and the Black-Scholes stock price model; - implement stochastic calculus (such as Ito's Lemma) to derive Black-Scholes pricing partial differential equation on various type of options; and find a solution to this partial differential equation.		
Pre-requisites	Pass in (STAT1301 and (MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	100% from coursework assessments		
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.		
Textbooks	To be decided by the course instructor.		
References	A. Etheridge: A Course in Financial Calculus (Cambridge University Press) M. Baxter and A. Rennie: Financial Calculus: An Introduction to Derivative Pricing (Cambridge University Press, 1996) P. Wilmott, S. Howison, J. Dewynne: The Mathematics of Financial Derivatives (Cambridge University Press, 1995) R. Jarrow, S. Turnbull: Derivative Securities (South-Western College Publishing, 1994)		
Course Website	http://hkumath.hku.hk/course/MATH2906/		

MATH2911 Game theory and strategy (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr T W Ng, Mathematics		
Course Aim	Game theory is the logical analysis of situations of conflict and cooperation. This course will introduce the students to the basic ideas and techniques of mathematical game theory in an interdisciplinary context.		
Course Contents	Combinatorial games and Zermelo's Theorem; Prisonner's Dilemma; pure and mixed strategies, minimax theorem; mixed Nash equilibria; application to biology: evolutionary stable strategies; games in coalition form; Shapley value; application to politics: Shapley-Shubik power index; core and von Neumann-Morgenstern solution; bargaining set.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the basic terminology and solution concepts in game theory; - compute explicitly different solution concepts for some simple cooperative and non-cooperative games; - apply game theoretical ideas and methods to solve some problems in economics and biology.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1201 and MATH1202) or MATH1211 or MATH1001 or MATH1111 or MATH1804 or MATH1805 or MATH1813		
Offer in 2012 - 2013	1st sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	Coursework assessment (100% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate an excellent understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems. B: Demonstrate a good understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. C: Demonstrate an acceptable understanding of key concepts and ideas of Game Theory by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. D: Demonstrate some understanding of key concepts and ideas of Game Theory 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.		
Textbooks	To be decided by the course instructor.		
References	Robert J. Aumann, Lectures on Game Theory, Westview Press, 1989.		
Course Website	http://hkumath.hku.hk/course/MATH2911/		

MATH2999 Directed studies in mathematics (6 credits)		Academic Year	2012
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr T W Ng, Mathematics		
Course Aim	This course is designed for a student who would like to take an early experience on independent study. It provides the student with the opportunity to do independently a small mathematics project close to research in nature.		
Course Contents	The subject matter of the project will be determined by consultation between the student and his supervisor. He must achieve good standing and get the approval from both the prospective supervisor and the course coordinator to take this course.		
Learning Outcomes	On successful completion of the course, students should be able to: - study independently a topic that is not available in the regular curriculum; - understand how mathematical theories are applied and/or extended in problem-solving; - gain experience in project writing and oral presentation.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2201, or already enrolled in this course; and Pass in MATH2301, or already enrolled in this course; and Pass in MATH2401, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No regular lectures. The student is expected to do approximately 100 hours of independent work and to attend meetings and seminars.		
Assessment Method	By dissertation (70% weighting) and continuous assessment which may include oral presentation (30% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical evaluation of information drawn from a broad range of high quality sources and to reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary		

	B	interpretations and to reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

MATH3302 Algebra II (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof J T Yu, Mathematics		
Course Aim	This course is an extension of Algebra I and goes deeper into the various topics treated in that course. Together, the two courses are complete in themselves, and may be followed by Topics in Algebra and Topics in Applied Discrete Mathematics.		
Course Contents	- Presentation of groups: generators and relations, free groups - Polynomial rings in several variables - Fundamental theorem on symmetric polynomials - Fields extensions, elements of Galois theory (characteristic zero)		
Learning Outcomes	On successful completion of the course, students should be able to: - understand and compute splitting fields of irreducible polynomials; - understand and compute typical extensions of fields; - compute the automorphisms and Galois groups of field extensions.		
Pre-requisites	Pass in MATH2301		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	J.B. Fraleigh: A First Course in Abstract Algebra (Addison-Wesley, 1989, 4th ed.) I.N. Herstein: Topics in Algebra (Wiley, 1975) N. Jacobson: Basic Algebra (Freeman, 1974) S. Lang: Undergraduate Algebra (Springer, 1996) T.W. Hungerford: Abstract Algebra: An Introduction (Saunders College Publishing, 1990, 2nd ed.)		
Course Website	http://hkumath.hku.hk/course/MATH3302/		

MATH3404 Functional analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr C W Wong, Mathematics		
Course Aim	This course introduces students to the basic knowledge of linear functional analysis, an important branch of modern analysis.		
Course Contents	- Metric spaces: Open and closed sets. Convergent sequences. Completeness - Normed spaces, Banach spaces: Finite dimensional normed spaces and subspaces. Compactness and finite dimension. Bounded linear operators. Normed spaces of operators, dual space - Inner product spaces, Hilbert spaces: Orthogonal complements, direct sums. Orthonormal sets and sequences, series related to orthonormal sets and sequences. Total orthonormal sets and sequences. Special polynomials. Riesz's representation theorem. Adjoint operator, self-adjoint, normal and unitary operators		

	- Fundamental theorems for normed and Banach spaces: Hahn-Banach theorem. Reflexive spaces. Category theorem, uniform boundedness principle. Open mapping theorem. Closed graph theorem - Spectral theory of linear operators		
Learning Outcomes	On successful completion of the course, students should be able to: - compare and contrast (i) finite and infinite dimensional linear spaces, (ii) complete and incomplete linear space, and (iii) normed and inner product spaces; in particular, recognize the importance of completeness and discuss how vectors are represented in these spaces; - understand the notions of Banach spaces and Hilbert Spaces. State and apply fundamental theorems in these spaces; - discuss the dual spaces of some standard Banach spaces; - discuss the boundedness of linear operators and the spectra of special linear operators; - apply functional analysis in the study of differential equations and optimization problems.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2401)		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.	
Textbooks	To be decided by the course instructor.		
References	Erwin Kreyszig: Introductory Functional Analysis with Applications (John-Wiley and Sons, 1978)		
Course Website	http://hkumath.hku.hk/course/MATH3404/		

MATH3406 Introduction to partial differential equations (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr S P Yung, Mathematics		
Course Aim	This course introduces students to the basic techniques for solving partial differential equations as well as the underlying theories.		
Course Contents	Laplace, heat and wave equations. Classification of partial differential equations. Boundary-value, initial-value and eigenvalue problems. Separation of variables, Fourier series, linearity and superposition, Duhamel's principle, characteristic method. Green's function, generalized functions and fundamental solutions. Maximum principle, existence, uniqueness and continuous dependence on data. If time permits Cauchy-Kowalevski theorem, variational method, nonlinear partial differential equations.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply the tools of calculus, linear algebra, mathematical analysis in a coherent way to PDE problems; - understand the basic theory of partial differential equations and the methods to solve them; - apply the knowledge of partial differential equations to physical sciences and engineering.		
Pre-requisites	Pass in MATH1111 and MATH1211 and MATH2201 and MATH2401; and Pass in MATH2405, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	100% from coursework assessments		
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.
Textbooks	To be decided by the course instructor.	
References	- W.A. Strauss: Partial Differential Equations: An Introduction, 2nd ed. (Wiley) - D. Bleecker & G. Scordas: Basic Partial Differential Equations (International Press) - L.C. Evans: Partial Differential Equations (American Mathematical Society)	
Course Website	http://hkumath.hku.hk/course/MATH3406/	

MATH3501 Geometry (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr P P W Wong, Mathematics		
Course Aim	As geometric forms often appear in nature, the study of geometry helps us to understand better the universe in which we live. Moreover, geometry has much intrinsic beauty and the study of it is an excellent training in intuitive thinking. In this course we study the differential geometry of curves and surfaces in 3-space. In the study of regular surfaces in 3-space we exhibit geometric notions that are definable in terms of metrical properties of these surfaces alone, leading to the intrinsic geometry of surfaces.		
Course Contents	Plane and space curves, regular surfaces in three-dimensional Euclidean space, the Gauss map, Gaussian and mean curvatures, Gauss's Theorema Egregium, Gauss-Bonnet Theorem.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the fundamental theorems on curves; - be able to compute the Gaussian and mean curvatures; - understand the basics of intrinsic geometry of surfaces.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2401)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.	
Textbooks	To be decided by the course instructor.		
References	M P Do Carmo: Differential Geometry of Curves and Surfaces (Prentice-Hall, 1976)		
Course Website	http://hkumath.hku.hk/course/MATH3501/		

MATH3511 Introduction to differentiable manifolds (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr P P W Wong, Mathematics		
Course Aim	The course aims at introducing students to the notion of differentiable manifolds and basic concepts and tools for their study, such as differential forms, exterior differentiation and integration; vector fields, distributions, and integrability; and covariant differentiation through affine connections. The course also aims at presenting concrete examples that are relevant to further fields of study. Especially, it introduces Lie groups through the use of matrix groups.		
Course Contents	Review on functions of several variables, inverse mapping theorem, implicit function theorem. Differentiable manifolds: definitions and examples. Maps between manifolds, submanifolds. Differential forms and exterior differentiation. Integration on manifolds. The tangent bundle, distributions and Frobenius Theorem. Matrix groups as Lie groups. Covariant differentiation: affine connections.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the basic language and concepts of modern differential geometry with examples; - apply the knowledge of algebra and analysis learned previously to solve geometric problems;		

	- understand the role of differential geometry in other branches of mathematics and theoretical physics.
Pre-requisites	Pass in (MATH2301 or MATH2303) and MATH2401 and MATH3501; and Pass in MATH2402, or already enrolled in this course.
Offer in 2012 - 2013	2nd sem — **Examination**: May
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and student-centered learning
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)
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.
Textbooks	To be decided by the course instructor.
References	Dennis Barden and Charles B. Thomas: An Introduction to Differential Manifolds, (Imperial College Press, 2003) W. Boothby: An introduction to differential manifolds and Riemannian Geometry, 2nd Ed., (Academic Press, 2002) John M. Lee: Introduction to smooth manifolds, (Springer, 2002)
Course Website	http://hkumath.hku.hk/course/MATH3511/

MATH3602 Scientific computing (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	This course introduces mathematical theories and computational techniques for solving various kinds of matrix computation problems that are often encountered in scientific or industrial applications.		
Course Contents	Introduction to scientific computing, systems of linear equations, direct methods, matrix norms, von Neumann series, iterative methods, eigenvalues, power method, spectral radius, Schur's Theorem, Gershgorin's Theorem, and some selected topics: multigrid methods, projection methods, recursion methods, fast Fourier transform, linear least squares, singular values, boundary value problems, partial differential equations, parallel computing, etc.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply direct method in solving a linear system; - analyze the complexity of a numerical algorithm; - give a proof for Schur's Theorem and Gershgorin's Theorem; - apply iterative methods in solving a linear system; - compute the singular values of a matrix.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2601, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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 numerical algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and 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 numerical algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and numerical algorithms or their applications and presentation or with some minor computational errors. C: Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and numerical algorithms, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. D: Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and numerical algorithms, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. Fail: Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems and numerical algorithms or their applications, or not being able to complete the solution.		
Textbooks	To be decided by the course instructor.		
References	Michael T. Heath: Scientific Computing (McGraw Hill, 1997)		

	Charles F. Van Loan: Introduction to Scientific Computing, Matlab Curriculum Series (Prentice Hall, 1997)
Course Website	http://hkumath.hku.hk/course/MATH3602/

MATH3902 Operations research II (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	The objective is to provide a fundamental account of the basic results and techniques of integer programming (IP), dynamic programming (DP) and Markov decision processes (MDP) in operations research. There is emphasis on aspects of algorithms as well as applications. The course serves, together with courses on linear programming and network models, to provide essential optimization concept and algorithms for more advanced studies in operations research.		
Course Contents	Integer programming and heuristics, dynamic programming (deterministic/stochastic) and Markov decision process (discounted/average costs).		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the terminology and nomenclature appropriate to integer programming, dynamic programming and Markov decision process; - explain the typical techniques employed in integer programming, dynamic programming and Markov decision process; - demonstrate the knowledge on algorithms for a variety of problems in operations research.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or (MATH1111 and MATH1211); and Pass in MATH2901, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches. B: Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. C: Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. D: Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. Fail: Demonstrates poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.		
Textbooks	To be decided by the course instructor.		
References	S. Dreyfus and A. Law: The Art and Theory of Dynamic Programming (Academic Press, 1977) P. Thie: Markov Decision Processes (COMAP, Inc. 1983) G.L. Nemhauser and L.A. Wolsey: Integer and Combinatorial Optimization (Wiley, 1988)		
Course Website	http://hkumath.hku.hk/course/MATH3902/		

MATH3903 Network models in operations research (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof S C K Chu, Mathematics		
Course Aim	The objective is to provide a fundamental account of the basic results and techniques of network models in operations research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on linear programming, to provide essential concept and background for more advanced studies in operations research.		
Course Contents	Graphs and algorithms. Trees, matchings and paths. Network models of transportation and assignment problems. Ford-Fulkerson network flow theory and computation for maximum flow and minimum cost flow algorithms. Applications to combinatorial optimization problems such as allocation, location and sequencing. Project networks, if time permits.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the fundamental concept and approach of graphs and network models appropriate to the further study of operations research; - demonstrate knowledge and understanding of the underlying techniques of the various graph and network algorithms and their extensions; - understand the theory of network flows and the duality aspects in such methods of flow computations.		
Pre-requisites	Pass in (MATH1101 and MATH1102) or (MATH1101 and MATH1201) or (MATH1101 and MATH1202) or (MATH1102 and MATH1201) or (MATH1102 and MATH1202) or (MATH1111 and MATH1211); and		

	Pass in MATH2901, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches. B: Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. C: Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. D: Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. Fail: Demonstrates poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.		
Textbooks	To be decided by the course instructor.		
References	M.S. Bazaraa, J.J. Jarvis and H.D.Sherali: Linear Programming and Network Flows. (2/e 1990) R.K. Ahuja, T.L. Magnanti and J.L. Orlin: Network Flows: Theory Algorithms, and Applications. (1993) H.A. Taha: Operations Research: an Introduction. (7/e 2003)		
Course Website	http://hkumath.hku.hk/course/MATH3903/		

MATH3907 Numerical methods for financial calculus (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	This course aims at providing effective numerical methods as well as their theoretical aspects for solving problems arisen from financial derivatives and asset pricing.		
Course Contents	Introduction to the mathematical theory of vanilla and exotic options. Numerical methods for Black-Scholes pricing differential equations together with their performance analyses. Binomial tree methods, Monte Carlo simulations and their performance analyses.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the martingale theory in option pricings as well as related financial derivatives; - implement and analyse various numerical methods on the Black-Scholes pricing differential equation; - explain the connection between the binomial tree method and the finite difference method of the Black-Scholes pricing differential equation; - implement and analyse Monte Carlo simulation methods on the martingale pricing formula.		
Pre-requisites	Pass in ((MATH1101 or MATH1102) and (MATH1201 or MATH1202)) or MATH1111 or MATH1211 or MATH1804 or MATH1805 or MATH1813; and Pass in MATH2603, or already enrolled in this course; and Pass in MATH2906, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	J. Strikwerda: Finite Difference Schemes and PDEs (Wadsworth & Brooks, 1989) Baxter and Rennie: Financial Calculus (Cambridge University Press, 1996)		

	Wilmott, Howison and Dewynne: The mathematics of Financial Derivatives (Cambridge University Press, 1995) Fleming and Rishel: Deterministic and Stochastic Optimal Control (Springer, 1975)
Course Website	http://hkumath.hku.hk/course/MATH3907/

MATH3988 Mathematics internship (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr T W Ng, Mathematics		
Course Aim	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the department.		
Course Contents	Within the university: each student will be supervised by a staff member (supervisor), working on a project or various tasks as instructed by the supervisor. Outside the university: each student will carry out approved work under the guidance and supervision of an external supervisor.		
Learning Outcomes	On successful completion of the course, students should be able to: - have gained work experience in an industry related to mathematical sciences; - have an understanding of how mathematics is used to solve real-world problems.		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give an oral presentation on their internship experience. Supervisors will assess the students based on their performance during the internship period (in the case of internships outside the university, the internal supervisor will assess the student based on the feedback by the external supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

MATH3999 Mathematics project (12 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr T W Ng, Mathematics		
Course Aim	The aim of the course is to provide students with opportunity to formulate and investigate, in depth, problems of practical interest and/or have a foretaste of mathematical research. The work, to be done on an individual basis, is considered a highly desirable part of the training of a mathematician.		
Course Contents	The subject matter of the project will be determined by consultation between the student and his/her supervisor. The projects will be selected from areas of pure and applied mathematics. Students must achieve good standing and get the approval from both the prospective supervisor and the course co-ordinator to take this course.		
Learning Outcomes	On successful completion of the course, students should be able to: - study independently and in depth an advanced topic that is not available in the regular curriculum; - analyze and synthesize information gathered from different sources; - articulate their findings and conclusions; - give an exposition of their work in a written report.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2301 and MATH2401)		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No regular lectures. The student is expected to do approximately 200 hours of independent work and to attend meetings and seminars.		
Assessment Method	By dissertation (70% weighting) and continuous assessment which may include oral presentation (30% weighting)		

Course Grade	A+ to F	
Grade Descriptors	A	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical evaluation of information drawn from a broad range of high quality sources and to reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
	B	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

MATH6501 Topics in algebra (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof J T Yu, Mathematics		
Course Aim	To provide students specializing in mathematics with the opportunity to study some topics in algebra in greater depth.		
Course Contents	A selection of advanced topics in algebra such as group theory, rings and modules, Galois theory, quadratic forms, multilinear algebra, algebraic number theory, group representation, introduction to commutative algebra, Grobner basis theory, introduction to algebraic geometry. The selection may vary from year to year.		
Learning Outcomes	On successful completion of the course, students should be able to: - acquire knowledge in the covered topics to considerable depth; - if he/she wishes, pursue more advanced studies in areas of algebra.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301) or (MATH1111 and MATH1211 and MATH2301); and Pass in MATH3302, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.	
Textbooks	To be decided by the course instructor.		
Course Website	http://hkumath.hku.hk/course/MATH6501/		

MATH6502 Topics in applied discrete mathematics (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof S C K Chu, Mathematics		
Course Aim	To provide students with the opportunity to study some further topics in applied discrete mathematics.		
Course Contents	A selection of advanced topics in discrete mathematics, which may include algebraic coding theory, cryptography, discrete optimization, extremal combinatorics, and algebraic and probabilistic methods in discrete mathematics. The selection may vary from year to year.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of some research areas of applied discrete mathematics;		

	- solve various discrete mathematics problems using some advanced techniques.		
Pre-requisites	Pass in MATH2600; and Pass in MATH2301, or already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	Instructor's lecture notes.		
Course Website	http://hkumath.hku.hk/course/MATH6502/		

MATH6503 Topics in mathematical programming and optimization (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	A study in greater depth of some special topics in mathematical programming or optimization. It is mainly intended for students in Operations Research or related subject areas.		
Course Contents	A selection of advanced topics, which may include convex, quadratic, geometric, stochastic programming, multi-objective programming and goal programming; or discrete and combinatorial optimization. The selection may vary from year to year.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the advanced concept and approach of the mathematical programming topic(s) and/or optimization approaches as appropriate in Operations Research; - demonstrate knowledge and understanding of the underlying theory and techniques of the various formulations and algorithms plus their extensions.		
Pre-requisites	(Pass MATH2901 and MATH2904); and (Pass in MATH3902, or already enrolled in this course); and (Pass in MATH3903, or already enrolled in this course).		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate an excellent understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches. B: Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors. 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.		
Textbooks	To be decided by the course instructor.		
References	M.S. Bazaraa and C.M. Shetty, Nonlinear Programming, 2nd edition (John Wiley & Sons, 1993) S.P. Bradley, A.C. Hax and T. Magnanti, Applied Mathematical Programming (Addison-Wesley, 1977) N. Christofides et al (ed.): Combinatorial Optimization (John Wiley & Sons, 1979) S.S. Rao, Optimization Theory and Applications (Wiley Eastern Ltd., 1978)		

	G. Nemhauser and L. Wolsey, Integer and Combinatorial Optimization (John Wiley & Sons, 1988) J.P. Ignizio: Introduction to Linear Goal Programming (Beverly Hills: Sage, 1985)
Course Website	http://hkumath.hku.hk/course/MATH6503/

MATH6504 Geometric topology (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Head of Dept, Mathematics		
Course Aim	This course gives a geometric introduction to some of the methods of algebraic topology. The emphasis throughout will be on the geometric motivations and applications of the theory.		
Course Contents	Continuity. Compactness. Connectedness. The fundamental group. Triangulations and classification of surfaces. Theory and applications of simplicial homology. Theory of covering spaces. Theory of attaching spaces.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand basic ideas and constructions which are important both in pursuing the deeper theories as well as in many applications in algebraic topology; - understand the ideas of attaching space, complexes, lifting and extension properties, and surgery on manifolds.		
Pre-requisites	Pass in (MATH1101 and MATH1102 and MATH1201 and MATH1202 and MATH2301 and MATH2401) or (MATH1111 and MATH1211 and MATH2201 and MATH2301 and MATH2401)		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centered learning		
Assessment Method	One 2.5-hour written examination (50% weighting) together with coursework assessment (50% weighting)		
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.		
Textbooks	To be decided by the course instructor.		
References	M.A. Armstrong, Basic Topology (Springer-Verlag UTM) J. Rotman, An Introduction to Algebraic Topology (Springer-Verlag GTM)		
Course Website	http://hkumath.hku.hk/course/MATH6504/		

MATH6505 Real analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Prof W S Cheung, Mathematics		
Course Aim	The aim of the course is to introduce the basic ideas and techniques of measure theory and the Lebesgue integral.		
Course Contents	- Lebesgue Measure on R: Measurable sets and Lebesgue measure, Measurable functions - The Lebesgue Integral: The Lebesgue integral, modes of convergence - Differentiation and Integration: Functions of bounded variation, Differentiation of an integral, absolute continuity - General Measure and Integration Theory: Measurable spaces, measurable functions, integration, convergence theorems, the Radon-Nikodym theorem - The L^p Spaces: The L^p spaces, convergence and completeness, bounded linear functionals		
Learning Outcomes	On successful completion of the course, students should be able to: - describe basic properties of Lebesgue measure and measurable functions; - construct the Lebesgue integral, elucidate its basic properties and appreciate the existence of other useful integration theories besides Riemann's; - understand the basic features of L^p spaces.		
Pre-requisites	Pass in MATH2401		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and student-centred learning		
Assessment Method	One 2.5-hour written examination together with coursework assessment. For undergraduate students taking this course, the final examination and coursework assessment would each contribute 50% towards the final grade.		
Course Grade	A+ to F		

Grade Descriptors	A	Demonstrate a thorough understanding of all concepts and ideas by being able to draw complex connections among various concepts and apply the theorems through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation, and with some innovative approaches to solving problems.
	B	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, reasoning, identifying the appropriate theorems, applications, or presentation.
	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 acceptable argument and presentation.
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation.
	Fail	Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.
Textbooks	To be decided by the course instructor.	
References	H.L. Royden: Real Analysis, Collier MacMillan W. Rudin: Real and Complex Analysis, McGraw Hill	
Course Website	http://hkumath.hku.hk/course/MATH6505/	

PHYS0003 Nature of the Universe (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr K M Lee, Physics		
Course Aim	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 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.		
Learning Outcomes	On successful completion of the course, students should be able to: - identify and describe the major objects in our Solar System and our universe (including stars and galaxies), and explain their main properties - use the celestial sphere model to describe the apparent trajectories of celestial objects - 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 - 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 - explain the evolution of stars and the evolution of the universe - review communicate astronomical problems and solutions using appropriate astronomical terminology and good English		
Pre-requisites	Nil (Not for students who have already passed in PHYS0001 or PHYS0002 before.)		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	48 hours of lectures and tutorials; 12 hours of laboratory work		
Assessment Method	One 1-hour written examination (50% weighting), and continuous assessment including presentation and homework assignments (50% weighting)		
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.		
Textbooks	E. Chaisson and S. McMillan: Astronomy Today (Pearson, 2010)		
Course Website	www.physics.hku.hk/~nature		

PHYS0612 Revealing the Magic in Everyday Life (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr M K Yip, Physics		
Course Aim	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 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.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe and discuss the physical principles that are behind the household appliances and the scientific issues in daily life - demonstrate their knowledge to related topics qualitatively - criticize and express views in logical and effective ways - recognize the significance of science and technology		
Pre-requisites	NIL (Not for students who have already passed in PHYS0607 before.)		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		

Teaching Hours	48 hours of lectures and tutorials
Assessment Method	One 1-hour written examination (50% weighting), and continuous assessment including assignments and presentation (50% weighting)
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.
Textbooks	Lecture notes provided by Course Coordinator L. A. Bloomfield: How Things Work: The Physics of Everyday Life (John Wiley & Sons, Inc, 2008, 3rd edition)

PHYS0625 Physics by inquiry (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F K Chow, Physics		
Course Aim	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	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.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe and distinguish the concepts and principles in introductory study of physics - recognize the underlying physical principles behind various daily life phenomena - explain physical phenomena using proper physical laws and theories - apply the fundamental techniques for quantitative analysis in solving physics problems - collect and analyse the data of physics experiments		
Pre-requisites	E or above in HKCEE Phys; and Not for students with E or above in AL Phys; and Not for students who have passed in PHYS1414 or PHYS1415 or PHYS1417, or already enrolled in these courses.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments, and laboratory work (50% weighting)		
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.		
Textbooks	John D. Cutnell and Kenneth W. Johnson: Essentials of Physics (John Wiley & Sons, Inc., 2006)		
References	Paul G. Hewitt: Conceptual Physics (Saunders Addison Wesley, Pearson Education, Inc., 2002, 9th edition) Raymond A. Serway and Jerry S. Faughn: College Physics (Saunders College Publishing, 2003, 6th edition)		
Course Website	http://www.physics.hku.hk/~phys0625/		
Remarks	Students without HKCEE Physics should obtain approval from course coordinator before choosing this course		

PHYS0629 Weather and climate (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	70
Course Co-ordinator	Dr K M Lee, Physics		
Course Aim	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	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.		
Learning Outcomes	On successful completion of the course, students should be able to: - recall the basic principles of weather and climate - apply the principles to interpret weather / climate information, for example from the HKO web site, internet or media - identify and explain the differences of weather and climate in Hong Kong as compared to other parts of the world - explain the basic causes of climate change and its potential impacts - describe and discuss the daily operational activities in the HKO		
Pre-requisites	E or above in HKCEE Phys		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments and project (50% weighting)		
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.		
Textbooks	Frederick Lutgens and Edward Tarbuck: The Atmosphere (Pearson Prentice Hall, 2010)		
Course Website	http://www.physics.hku.hk/~phys0629/		

PHYS1315 Methods in physics I (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F K Chow, Physics		
Course Aim	This course provides students with experience in using mathematical tools and techniques to solve problems in physics. It is complete in itself, or may also be followed by Methods in Physics II.		
Course Contents	3D coordinate geometry; Differential and integral calculus of single variable functions with applications in physical systems; Cartesian, cylindrical and spherical coordinates; Vector functions; Partial derivatives, extremes of multi-variable functions and the Taylor series in two-variable functions; Lagrange undetermined multipliers; Double and triple integrals in Cartesian, cylindrical and spherical coordinates; Calculations of centers of mass, moments of inertia and electric potentials; Solutions of ordinary differential equations in first, second and higher orders and their applications in particle dynamics, circuit theories and nuclear physics.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe the connections between mathematical equations and physical problems - state and set up mathematical equations to describe the dynamics and evolution of physical systems - solve various physical problems by using suitable mathematical skills - demonstrate knowledge of choosing correct solution of mathematical equations to describe the behavior of physical systems		
Pre-requisites	(E or above in AL Pure Math or AS Math & Stat or HKCEE Add Math; or Pass in MATH1804); and Not for students who have already passed in MATH1811 before; and Not for students who have already passed in MATH1812 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and 12 hours of tutorials		

Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests and homework assignments (50% weighting)		
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.		
Textbooks	Lecture notes provided by Course Coordinator		
References	Riley K. F., Hobson M. P. and Bence S. J.: Mathematical Methods for Physics and Engineering (Cambridge, 1998) Wylie C. R. and Barrett L. C.: Advanced Engineering Mathematics (McGraw Hill, 1995) Edwards C. H. and Penney D. E.: Calculus (Prentice Hall, 2002)		
Course Website	http://www.physics.hku.hk/~phys1315/		

PHYS1316 Methods in physics II (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr W Yao, Physics		
Course Aim	This course provides students with experience in using mathematical tools and techniques to solve problems in physics. It is complete in itself, or may also be taken after Methods in Physics I.		
Course Contents	Analytic geometry in three dimensions, gradient, divergence, curl and Laplacian; Line integrals, surface integrals and volume integrals; Conservative fields and potentials; Green's theorem, divergence theorem and the Stokes' theorem; Curvilinear coordinates; Applications of vector calculus in classical mechanics and electrodynamics; Vector spaces and matrix algebra; Properties of some special matrices: Hermitian mattices and unitary matrices, etc. Quadratic forms, eigenvalue problems and diagonalisation of matrices; Applications of matrix theory in physics problems.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe the connection between field analysis and physical problems - set up and calculate various differential and integral operations in field analysis, and describe their physical meanings - calculate various matrix algebra that frequently appears in physical studies - solve eigenvalue problems of matrices that frequently appears in physical studies		
Pre-requisites	(E or above in AL Pure Math or AS Math & Stat or HKCEE Add Math; or Pass in PHYS1315 or MATH1804); and Not for students who have already passed in MATH1811 before; and Not for students who have already passed in MATH1812 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including tests and homework assignments (40% weighting)		
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.		
Textbooks	Lecture notes provided by course coordinator		
References	Riley K. F., Hobson M. P. and Bence S. J.: Mathematical Methods for Physics and Engineering (Cambridge, 1998) Wylie C. R. and Barrett L. C.: Advanced Engineering Mathematics (McGraw Hill, 1995) Edwards C. H. and Penney D. E.: Calculus (Prentice Hall, 2002)		
Course Website	http://www.physics.hku.hk/~phys1316/		

PHYS1414 General physics I (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr M K Yip, Physics		
Course Aim	This course is the first of a two-course series designed to offer a comprehensive training of physics covering all the major building blocks of the physical laws governing nature, including mechanics, thermal physics, oscillation and waves, optics, and electricity and magnetism. A calculus-based approach is adopted.		
Course Contents	This course will introduce and discuss the following topics: Dimensional analysis, Newton's laws of motion, linear momentum, angular momentum and their conservation laws, system of many particles, motion of rigid bodies, gravitational field, heat and temperature, basic concepts of the laws of thermodynamics, kinetic theory of gases.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe and explain the physical principles of mechanics and thermodynamics - apply these principles, together with logical and mathematical reasoning, to situations of the physical world - analyse and solve related physical problems using the calculus-based approach - acquire and interpret experimental data to examine the physical laws		
Pre-requisites	(E or above in HKCEE Add Math or AS Math & Stat or AL Pure Math); and (E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0114 or PHYS0625); and Not for students who have already passed in PHYS1111 or PHYS1112 or PHYS1113 or PHYS1314 before.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials; 9 hours of laboratory work		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests homework assignments, and laboratory work (50% weighting)		
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.		
Textbooks	P. A. Tipler and G. Mosca: Physics for Scientists and Engineers (Freeman, 2008, 6th edition)		
References	R. D. Knight: Physics for Scientists and Engineers (Pearson, 2008, 2th edition) R. Resnick, D. Halliday and K. Krane: Physics Volume 1 (John Wiley and Sons, 2002, 5th edition) R. Serway and J. W. Jewett: Physics for Scientists and Engineers (Thomson, 2004, 5th edition)		
Course Website	http://www.physics.hku.hk/~phys1414/		

PHYS1415 General physics II (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr J C S Pun, Physics		
Course Aim	This course is the second of a two-course series designed to offer a comprehensive training of physics covering all the major building blocks of the physical laws governing nature, including mechanics, thermal physics, oscillation and waves, optics, and electricity and magnetism. A calculus-based approach is adopted.		
Course Contents	This course will introduce and discuss the following topics: Coulomb's law, electric field and potential, Gauss' law, capacitance, electric current and circuit, magnetic field and Ampere's law, Faraday's law, inductance and Lenz's law, Maxwell's equations, oscillations and waves, wave nature of light, diffraction and interference.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe and explain the physical principles of electricity and magnetism, oscillations, waves, and optics - apply these principles, together with logical and mathematical reasoning, to situations of the physical world - analyse and solve related physical problems using the calculus-based approach - acquire and interpret experimental data to examine the physical laws		
Pre-requisites	(E or above in HKCEE Add Math or AS Math & Stat or AL Pure Math); and (E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0115 or PHYS0625); and Not for students who have already passed in PHYS1111 or PHYS1112 or PHYS1113 or PHYS1314 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May

Offer in 2013 - 2014	N
Teaching Hours	36 hours of lectures and tutorials; 9 hours of laboratory work
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments, and laboratory work (50% weighting)
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.
Textbooks	P. A. Tipler and G. Mosca: Physics for Scientists and Engineers (Freeman, 2008, 6th edition)
References	R. D. Knight: Physics for Scientists and Engineers (Pearson, 2008, 2th edition) R. Resnick, D. Halliday, and K. Krane: Physics Volume 2 (John Wiley and Sons, 2002, 5th edition) R. Serway and J. W. Jewett: Physics for Scientists and Engineers (Thomson, 2004, 5th edition)
Course Website	http://www.physics.hku.hk/~phys1415/

PHYS1417 Basic physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr S J Xu, Physics		
Course Aim	This course covers the essential topics in physics in one semester, with the emphases placed on conceptual ideas rather than rigorous mathematical treatments. It serves as a first course to students who are interested in physics or those who are planning to take physics as a minor.		
Course Contents	Mechanics (linear and circular motion, simple harmonic motion, Newton's law, momentum, and energy), Wave and Optics, Thermal Physics, Electromagnetism and an introduction to Modern Physics.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe the fundamental principles of physics - apply these principles to solve basic physics problems - explain real-world physical phenomena - acquire and interpret experimental data to test and examine the physical laws		
Pre-requisites	(E or above in AL Phys or AS Phys or AL Eng Sc; or Pass in PHYS0625); and Not for students who have already passed in any of the following courses before: PHYS0114, PHYS0115, PHYS1111, PHYS1112, PHYS1113, PHYS1413; and Not for students who have passed in PHYS1414 or PHYS1415, or have already enrolled in either course.		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lecture, 2 hours of tutorials, and 6 hours of laboratory work		
Assessment Method	One 2-hour written examination (60% weighting), course work including homework and quizzes (25% weighting), and laboratory work (15% weighting)		
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. 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		

	Fail	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.
Textbooks	Lecture notes provided by course coordinator	
References	Alan Giambattista, Betty Richardson and Robert C. Richardson: Physics (McGraw-Hill, 2004)	
Course Website	http://www.physics.hku.hk/~phys1417/	
Remarks	The HKU-SPACE course College Physics I or II, PHYS1413 and PHYS1417 are mutually exclusive.	

PHYS2021 The physical universe (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr K M Lee, Physics		
Course Aim	To appreciate the underlying physical principles of astronomy. This course is designed for second or third year students with some basic science knowledge.		
Course Contents	Topics include: the sky and the calendar, spherical geometry, optics and telescopes, basic celestial mechanics, scattering cross section and Saha equation. Students are expected to participate actively in the night sky observations as well.		
Learning Outcomes	On successful completion of the course, students should be able to: - calculate the transformation between different celestial coordinate systems - describe the formation of spectral lines and basic structures of telescopes - derive the orbits in two body problem from first principle - recall the definition of scattering cross section and Saha equation		
Pre-requisites	Pass in PHYS0001 or PHYS0003		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials; 4 hours of night sky observation		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including tests and homework assignments (40% weighting)		
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.	
Textbooks	Lecture notes provided by course coordinator		
References	Frank H. Shu: The Physical Universe: An Introduction to Astronomy (University Science Books, 1982)		
Course Website	http://www.physics.hku.hk/~phys2021/		

PHYS2022 Observational astronomy (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	30
Course Co-ordinator	Dr J J L Lim, Physics		
Course Aim	This course aims to introduce to the students the tools of contemporary observational astronomy. We will discuss the physics of light detection at radio, infrared, visible, X-ray, and gamma-ray wavelengths, and the instruments and techniques used for observations of celestial objects over the full range of electromagnetic radiation. The emphasis is on a hands-on approach for students to gain experience in doing astronomical observations and data reduction.		
Course Contents	This course will introduce and discuss the following topics: properties and configurations of optical telescopes; properties of light, atmospheric effects on observations; non-optical telescopes; properties of astronomical detectors (PMT, CCD); astronomical imaging and magnitude system; astronomical spectroscopy; observations of stars and galaxies including blackbody radiation, color-magnitude system, emission and absorption spectrum, and astronomical redshifts; cosmological observations.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe and explain the workings of astronomical telescopes (operating in optical and non-optical wavelengths)		

	and modern astronomical detectors (PMT and CCD) - describe the effects of the Earth's atmosphere on astronomical observations - understand how the methods of astronomical photometry and spectroscopy are applied to the observations of stars, galaxies, and the universe - prepare a presentation on the observational aspects of celestial objects using the above information and from materials in research literature - operate a small optical telescope to conduct simple night sky observations		
Pre-requisites	Pass in PHYS0001 or PHYS0002 or PHYS0003		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials; 6 hours of laboratory work		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including mid-term, homework assignments, project presentation, and laboratory works (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery of 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.		
Textbooks	Andrew J. Norton: Observing the Universe (Cambridge University Press, 2004)		
References	Hale Bradt: Astronomy Methods: A Physical Approach to Astronomical Observations (Cambridge University, 2004) Robert C. Smith: Observational Astrophysics (Cambridge University Press, 1995)		
Course Website	http://www.physics.hku.hk/~phys2022/		

PHYS2039 Principles of astronomy (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr J J L Lim, Physics		
Course Aim	To introduce and place in the context of contemporary astrophysics a number of basic physical principles widely used in astronomy		
Course Contents	Topics include: blackbody radiation, spectral lines, thermal Maxwellian and non-thermal velocity distributions, single-dish telescopes and interferometers, celestial mechanics, ideal gas laws, virial theorem, Eddington limit		
Learning Outcomes	On successful completion of the course, students should be able to: - differentiate between thermal and non-thermal radiative processes in astronomical objects - sensibly suggest which telescopes to best use to measure different astrophysical quantities - make relevant calculations in astrophysical settings on the topics introduced		
Pre-requisites	Pass in PHYS1413 or PHYS1414 or PHYS1415 or PHYS1417		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including tests and homework assignments (40% weighting)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery of the knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities, clear logical thinking, evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar, and unfamiliar situations using highly effective organizational and presentation skills. B: Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities, logical thinking, and ability to apply knowledge to most familiar situations using 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 using limited or barely effective organizational and presentational skills. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve		

		problems. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Bradley W Carroll and Dale A. Ostlie: An Introduction to Modern Astrophysics (Addison-Wesley, 2007, 2nd edition), and Lecture notes provided by course coordinator	
References	TBC	
Course Website	http://www.physics.hku.hk/~phys2039	

PHYS2221 Introductory solid state physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof J Gao, Physics		
Course Aim	To provides a broad introduction to modern theories of the behaviour and properties of the solid state of matter. It is designed as a self-contained course which at the same time will serve as a basis for more advanced courses and projects in solid state physics.		
Course Contents	Crystal structures and symmetry. The reciprocal lattice and X-ray diffraction in crystals. Lattice vibrations. Free-electron theory of metals. Energy bands; metals, semiconductors, and insulators. Dielectric and magnetic properties.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge for crystal structures and characterization - describe the behavior of solid matter and explain the underlying physical concepts - apply physical principles and mathematical equations to discuss the physical properties of materials - apply essential skills of making measurements with appropriate instruments in physics experiments - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS1413 or PHYS1417 or (PHYS1414 and PHYS1415); and Pass in PHYS2627, or already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures, tutorials, and laboratory work		
Assessment Method	One 2-hour written examination (60% weighting), course work including tests and homework assignments (30% weighting), and laboratory work (10% weighting)		
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.		
Textbooks	C. Kittel: Introduction to Solid State Physics (John Wiley, 1986, 6th ed.)		
Course Website	http://www.physics.hku.hk/~phys2221		

PHYS2222 Waves and optics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr J K C Leung, Physics		
Course Aim	To give a coherent introduction to the development of modern physical optics, with particular attention to the wave properties of light and optic application		
Course Contents	mathematical theory of wave motion and the electromagnetic theory of light; the propagation of light and the laws of reflection and refraction; superposition and Fourier analysis of waves; theories, experimental observation and applications of polarization, interference and diffraction, thick lenses		
Learning Outcomes	On successful completion of the course, students should be able to: - explain and calculate the properties of waves including propagation, reflection, refraction, polarization, interference and diffraction by using the theory of waves. - apply the theory of optics to calculate the geometrical parameters of thick lenses and design optic devices. - apply essential theories to design anti-reflection and reflection-enhancement films		
Pre-requisites	Pass in PHYS1413 or PHYS1417 or (PHYS1414 and PHYS1415)		

Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (75% weighting), and continuous assessment (25% weighting)		
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.		
Textbooks	Eugene Hecht: Optics, (Addison-Wesley, 2001, 4th ed.)		
References	R. Guenther: Modern Optics (John Wiley, 1990)		

PHYS2227 Laser and spectroscopy (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr S J Xu, Physics		
Course Aim	The course aims at providing a broad introduction to major types of lasers and modern laser spectroscopy.		
Course Contents	Introduction to lasers and modern laser spectroscopy. Fundamentals of optical processes and spectroscopic techniques. Lasers as spectroscopic light sources. Components of spectroscopic instruments. Spectroscopy of solids. Low-temperature laser-induced photoluminescence experiment of GaN or ZnO.		
Learning Outcomes	On successful completion of the course, students should be able to: - restate the properties of fundamental optical processes - describe fundamental operation principle of modern lasers - demonstrate solid knowledge of modern laser spectroscopic techniques - identify main components of modern optical spectroscopic instruments - employ laser photoluminescence setup to measure low-temperature photoluminescence spectra of solid samples - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS2222 and PHYS2323; and Pass in PHYS2221, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	32 hours of lectures and tutorials; 4 hours of laboratory work		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments and laboratory work (50% weighting)		
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.		
Textbooks	J. Garcia Sole, L. E. Bausa, and D. Jaque: An Introduction to the Optical Spectroscopy of Inorganic Solids (John Wiley & Sons, 2005) and Lecture Notes prepared by course coordinator		
References	E. R. Menzel: Laser Spectroscopy (Marcel Dekker Inc., 1995).		
Course Website	http://www.physics.hku.hk/~phys2227/		

PHYS2235 Physics of nanomaterials (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr S J Xu, Physics		
Course Aim	This course is designed to let senior undergraduate students and fresh postgraduate students know fundamental concepts and physical properties of nanomaterials including two-dimensional quantum wells, one-dimensional quantum wires and zero-dimensional quantum dots.		
Course Contents	Introduction to nanomaterials and quantum size effect. Dimensionalities and density of states of various nanomaterials. Optical and transport properties of quantum wells, superlattices and two-dimensional electron gas. Physical properties of carbon nanotubes and semiconductor nanowires. Physical properties of quantum dots and nanocrystals. Fundamental principles of scanning tunneling microscopy and advanced thin-film growth techniques such as molecular beam epitaxy and metalorganic chemical vapor deposition.		
Learning Outcomes	On successful completion of the course, students should be able to: - recall basic concepts and knowledge of dimensionality, density of states, quantum size effect - identify and compare optical and transport properties of quantum wells, superlattices and two-dimensional electron gas - recognise the fundamental principles of scanning tunneling microscopy and advanced thin-film growth techniques such as molecular beam epitaxy and metalorganic chemical vapor deposition - describe the basic physics of carbon nanotubes and semiconductor nanowires - explain physical properties of zero-dimensional quantum dots and nanocrystals		
Pre-requisites	Pass in PHYS2323; and Pass in PHYS2221, or already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including tests and homework assignments (40% weighting)		
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.		
Textbooks	Lecture Notes prepared by the course coordinator		
References	A. S. Edelstein and R. C. Cammarata: Nanomaterials: synthesis, properties and applications (Institute of Physics Pub, 1998); G. Cao: Nanostructures and Nanomaterials (Imperial College Press, 2004).		
Course Website	http://www.physics.hku.hk/~phys2235/		

PHYS2321 Introductory electromagnetism (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr X D Cui, Physics		
Course Aim	To provide those students who major in Physics with a preliminary knowledge of electrostatic and magnetism physical concepts required for an understanding of electricity and magnetism.		
Course Contents	The course introduces electric fields and potential, methods in electrostatics, conductors and dielectrics, magnetostatics and electromagnetic induction. Magnetic properties of materials. And Maxwell's equations.		
Learning Outcomes	On successful completion of the course, students should be able to: - identify the fundamental physics in electrostatics and magnetism - apply mathematical tools to describe electrostatics and magnetism. - use the Maxwell's equations to explain various electrostatic and magnetic phenomena - differentiate between electrostatics in vacuum and in dielectric materials - differentiate between magnetism in vacuum and in magnetic materials - apply essential skills of making measurements with appropriate instruments in physics experiments - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS1414 and PHYS1415 and PHYS2627		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		

Teaching Hours	36 hours of lectures and tutorials; 9 hours of laboratory work
Assessment Method	One 3-hour written examination (60% weighting), and continuous assessment including tests, homework assignments and laboratory work (40% weighting)
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.
Textbooks	D. J. Griffiths: Introduction to Electromagnetism (Prentice-Hall, 3rd ed.)
References	I. S. Grant & W.R. Philips: Electromagnetism (John Wiley, 1975) J. R. Reitz, F. J. Milford, & R. W. Christy: Foundations of Electromagnetic Theory (Addison-Wesley, 1992) P. Lorrain & D. R. Corson: Electromagnetic Fields and Waves (John Wiley, 1991)
Course Website	http://www.physics.hku.hk/~phys2321/

PHYS2322 Statistical mechanics and thermodynamics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof S Fung, Physics		
Course Aim	An introduction to Statistical Mechanics and elementary Thermodynamics with reference to related phenomena in Physics. This course is taught as a basic and essential subject for students majoring in Physics.		
Course Contents	Boltzmann, Fermi and Bose-Einstein statistics. First, second and third laws of Thermodynamics. Disorder and entropy; concept of temperature; the free energy. Density of states. Classical gas, electrons in metals, and black body radiation. Heat capacities. Thermal properties of magnetic systems.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and discuss the basic concept of thermodynamics and statistical mechanics - state the three laws of Thermodynamics - explain and describe the relationship between heat and work - describe the features and examples of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics - describe the relationship between entropy and disorder - apply essential skills of making measurements in Physics experiments with appropriate instruments - interpret the experimental data and compare with predictions from underlying physical principles		
Pre-requisites	Pass in PHYS1414 and PHYS1415 and PHYS2627		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials; 8 hours of laboratory work		
Assessment Method	One 2-hour written examination (60% weighting), course work including tests and homework assignments (30% weighting), and laboratory work (10% weighting)		
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.		

Textbooks	F. Mandl: Statistical Physics (John Wiley, 1988, 2nd ed.).
References	C. Kittel: Elementary Statistical Physics (Robert E. Krieger, 1988).
Course Website	http://www.physics.hku.hk/~phys2322/

PHYS2323 Introduction to quantum mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr W Yao, Physics		
Course Aim	This course aims at a rigorous introduction to the concepts and methods of non-relativistic quantum mechanics. It is a prerequisite for several advanced physics courses.		
Course Contents	Time-dependent Schrodinger equation; statistical interpretation of wave function; probability density; probability current and continuity equation; momentum; physical observable and expectation value; Heisenberg uncertainty principle; time-independent Schrodinger equation; Hamiltonian and stationary states; particle in a square well; transmission and reflection at a barrier; harmonic oscillator problem using ladder operators; free particle and wavepacket; delta function potential; Dirac notations; state vectors; Hilbert space; Hermitian operators; eigenstates and eigenvalues; generalized statistical interpretation; generalized uncertainty principle; angular momentum; hydrogen atom; atomic orbits; spin; identical particles; Pauli exclusion principle; fermion and bosons; non-degenerate perturbation theory.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe the statistical interpretation of quantum mechanical systems, and calculate expectation values and uncertainty of physical observables - formulate energy eigenvalue problems, and solve them in examples where potentials have simple analytical forms - formulate time evolution of the wavefunction and the expectation value of physical observables with known energy eigenfunctions - judge the applicability of time-independent perturbation theory and formulate leading order energy corrections in certain perturbations applied to the physical system - recognise concepts such as angular momentum, spin, fermion and bosons, which will be further elaborated in several advanced physics courses - apply essential skills of making measurements with appropriate instruments in physics experiments - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS2627		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials; 9 hours of laboratory work		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including tests, homework assignments and laboratory work (40% weighting)		
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.		
Textbooks	D. J. Griffiths: Introduction to Quantum Mechanics (Pearson Education, 2005)		
References	R. L. Liboff: Introductory Quantum Mechanics (Addison-Wesley, 2003, 4th ed.) N. Zettili: Quantum Mechanics, Concepts and Applications (John Wiley & Sons, 2001) S. Gasiorowicz: Quantum Physics (John Wiley & Sons, 2003)		
Course Website	http://www.physics.hku.hk/~phys2323/		

PHYS2325 Theoretical physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	50
Course Co-ordinator	Prof Z D Wang, Physics		
Course Aim	The aim of this course is to provide students with the conceptual skills and key analytical tools for solving real problems in all major areas of physics.		
Course Contents	This course will introduce and discuss the following topics: Application of complex variables including the Cauchy's		

	integral formula and calculus of residues, Partial differential equations (the general wave equation, the Schrodinger equation, the Poisson equation, and the diffusion equation), Properties of special functions widely used in Physics (Gamma functions, Beta functions, Bessel functions, spherical harmonics etc.), and Fourier Series.
Learning Outcomes	On successful completion of the course, students should be able to: - analyse and examine the analytical properties of complex functions that commonly appear in physical problems. - calculate various definite integrals using the method of residues in seeking the solution of physical problems - analyse and solve the first and second order ordinary equations, and typical partial differential equations governing the dynamics of physical systems - apply the special functions in handling various physical problems - use the Fourier Series in describing any periodic function in the study of various physical phenomena
Pre-requisites	Pass in PHYS1414 or PHYS1415 or PHYS2627; and Pass in (PHYS1315 and PHYS1316) or (MATH1804 and MATH1805) or (MATH1111 and MATH1211)
Offer in 2012 - 2013	1st sem; **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and tutorials
Assessment Method	One 3-hour written examination (80% weighting), and continuous assessment including tests and homework assignments (20% weighting)
Course Grade	A+ to F
Grade Descriptors	
Textbooks	G. Arfken and H. Weber: Mathematical Methods for Physicists (Academic Press, 2005)
References	E. Butkov: Mathematical Physics (Addison-Wesley, 1973)
Course Website	http://www.physics.hku.hk/~phys2325/

Grade Descriptors:

Grade	Descriptor
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.

PHYS2533 Directed studies in physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr H F Chau, Physics		
Course Aim	This course is designed for highly selective second year students who are interested in tackling a research project in physics. It provides students with the opportunity to study a physics problem by themselves, either theoretical or experimental, under the supervision by an academic staff. The available projects are close to research in nature and are designed for prospective research students.		
Course Contents	Students interested in taking this course should contact their prospective supervisors in May to determine the contents and the nature of their projects in the coming academic year. They must get the approval from the course coordinator based on their GPA, and suitable arrangement with individual supervisor to take this course. Theoretical projects: The student will receive training in research literature reading and reviewing, and make investigation which is close to research work in nature, under the supervision of a staff member. The student may need to perform some original calculations; to fill in mathematical gaps of some sophisticated derivations, or a combination of both. In some cases, it may be necessary to use computers. Experimental projects: The student will carry out experiments in research laboratories under the supervision of a staff member. The student will receive training in advanced experimental techniques, including preparation of samples, determination of physical properties, measurement of small signals obscured by noise, laser, high-vacuum and low-temperature techniques etc. Wide reading of the relevant scientific literature is expected.		
Learning Outcomes	On successful completion of the course, students should be able to: - execute a theoretical or experimental research project on a special topic in physics - review the knowledge of a physics problem through literature review of books and research journals - describe and explain connections between physical principles and the study problem. - (for theoretical projects) identify the key issues of the problem and solve some or all of them independently, and compare the results with predictions or existing solutions - (for experimental projects) execute physics experiments, analyze results and sources of errors of the experiment in comparison with predictions		
Pre-requisites	Pass in one of these courses: PHYS0001, PHYS0002, PHYS0003, PHYS1303, PHYS1315, PHYS1316, PHYS1414, PHYS1415, PHYS1417		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Small group instruction up to 2 scheduled hours per week over two semesters. Students will be assigned a supervisor who will provide individual instruction on a particular physics project.		
Assessment Method	Continuous assessment (100% weighting) in the form of a report of 20-40 pages (inclusive figures and references)		

	and an oral presentation.
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Course Website	http://www.physics.hku.hk/~phys2533/

PHYS2626 Introductory classical mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F C C Ling, Physics		
Course Aim	This course aims at providing students a solid foundation in classical Newtonian mechanics with rigorous mathematical treatments. Students are expected to have good working knowledge of calculus and vectors.		
Course Contents	Newton's law of motion, inertia and non-inertia frames of reference, linear momentum and its conservation, conservative force field and mechanical energy conservation, simple harmonic oscillation, coupled oscillation and normal mode, angular momentum and its conservation, system of particles, motion of rigid body, central force field, inertia tensor, principal axes, Euler Equation.		
Learning Outcomes	On successful completion of the course, students should be able to: - define the logical framework of Newtonian Mechanics and recognise the validity of Newtonian Mechanics - demonstrate transformations between inertia and non-inertia frames. - recall the principles for Newtonian Mechanics for single particle and solve the corresponding problems. - recognise simple harmonic oscillations with damping and driving force, and calculate the normal modes for coupled oscillators. - recall the concepts of many-particle system and rigid body motion, and solve the corresponding problem. - state the physics of central force field problem, with gravitational force field as an illustrating example. - recognise the angular momentum theory and solve the corresponding problems. - apply essential skills of making measurements with appropriate instruments in physics experiments - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS1413 or PHYS1417 or PHYS1414		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures; 6-8 hours of tutorials/example classes; and 9 hours of laboratory work		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments and laboratory work (50% weighting)		
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.		
Textbooks	David Morin: Introduction to Classical Mechanics With Problems and Solutions (Cambridge University Press, 2008, 1st Ed.)		

References	A. Arya: Introduction to Classical Mechanics (Prentice Hall, 1998)
Course Website	http://www.physics.hku.hk/~phys2626/

PHYS2627 Introductory quantum physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F C C Ling, Physics		
Course Aim	This course is designed to provide students with a comprehensive introduction to the concepts and ideas related to study of physics in the microscopic scale-which revolutionize our understanding of the properties of light and matter in the universe.		
Course Contents	The course will cover the origin, development and applications of quantum theory, the wave-particle duality of nature, the Heisenberg uncertainty principle, time-independent Schrodinger equation and the wave function, and atomic physics.		
Learning Outcomes	On successful completion of the course, students should be able to: - recognize the limitation of classical physics - recognize the duality nature of matter and wave, and the uncertainty principle - recall time-independent Schrodinger equation, and use it to solve the problems for simple potential wells, potential steps and tunneling - recognise quantum structure of hydrogen and many electron system - apply essential skills of making measurements with appropriate instruments in physics experiments - interpret the experimental data and compare with the prediction of underlying physical principle		
Pre-requisites	Pass in PHYS1413 or PHYS1417 or PHYS1414 or PHYS1415; and Not for students who have already passed in PHYS1314 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials; 9 hours of laboratory work		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments and laboratory works (50% weighting)		
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.		
Textbooks	R. Harris: Modern Physics (Addison-Wesley, 2008, 2nd ed.)		
References	K. Krane: Modern Physics (Wiley, 1996) R. Eisberg and R. Resnick: Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles (Wiley, 1985) R. A. Serway, C. J. Moses and C. A. Moyer: Modern Physics (Thomson, 2005, 3rd ed.) P. T. Tipler and R. A. Llewellyn: Modern Physics (W. H. Freeman, 1999)		
Course Website	http://www.physics.hku.hk/~phys2627/		

PHYS2628 Atomic and nuclear physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr S Zhang, Physics		
Course Aim	This course will introduce students to the fundamentals of atomic physics and rudimentary nuclear physics. It aims to provide a coherent and concise coverage of traditional atomic and nuclear physics. Important topics of current research interest will be also discussed, such as laser cooling and trapping which plays an important role in the realization of Bose-Einstein condensate in atomic vapors.		
Course Contents	Topics include: Atomic structure of hydrogen and hydrogen-like atom, multi-electron atom, atom in electromagnetic field, spectroscopy, laser trapping and cooling; nuclear structure, shell model and nuclear reactions. Applications of the basic principles of atomic and nuclear physics will be mentioned when appropriate.		
Learning Outcomes	On successful completion of the course, students should be able to: 1. Apply general considerations of quantum physics to atomic and nuclear system; make general orders of magnitude of estimation of physical effects		

	2. Explain how light interacting with atom; the working principle of laser trapping and cooling 3. Recognize the general features of atomic/nuclear spectroscopy 4. Apply quantum physics to understand the basic features of simple nuclei, binding of deuteron et al.		
Pre-requisites	Pass in PHYS2627 Introductory quantum physics		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and 18 hours of tutorials		
Assessment Method	One 2-hour written examination (50% weighting), continuous assessment including tests (30% weighting) and homework assignments (20% weighting)		
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.		
Textbooks	Lecture notes provided by Course Coordinator W. Demtroder, Atoms, molecules and photons (Springer, 2nd, 2011) K. Krane, Introductory nuclear physics (John Wiley & Sons, 1988)		

PHYS3033 General relativity (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr T C Harko, Physics		
Course Aim	To introduce students to the field of general relativity. To provide conceptual skills and analytical tools necessary for astrophysical and cosmological applications of the theory		
Course Contents	The Principle of equivalence. Inertial observers in a curved space-time. Vectors and tensors. Parallel transport and covariant differentiation. The Riemann tensor. The matter tensor. The Einstein gravitational field equations. The Schwarzschild solution. Black holes. Interior equations for spherically symmetric stars. Gravitational waves.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply the mathematical and physical ideas of the theory of general relativity for the study of various systems in astrophysics and cosmology - explain the observational effects at the scale of the Solar System that cannot be described by Newtonian gravity from a general relativistic point of view - demonstrate knowledge and discuss the dynamic interactive physical processes in astrophysics by using a general relativistic approach		
Pre-requisites	Pass in PHYS1303 and PHYS2321 and PHYS2322 and PHYS2323		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests and homework assignments (50% weighting)		
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.		

Textbooks	Lecture notes provided by course instructor.
References	R. d'Inverno: Introducing Einstein's Relativity (Clarendon Press, Oxford, 1992) J. L. Martins: General Relativity: A First Course for Physicists (Prentice Hall, London, New York, 1996) M. Ludvigsen: General Relativity: A Geometric Approach (Cambridge University Press, Cambridge, New York, 1999)
Course Website	http://www.physics.hku.hk/academic/courses/phys3033/index.html

PHYS3034 Cosmology (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr T C Harko, Physics		
Course Aim	The aim of the course is to offer an advanced introduction to cosmology, to familiarize students with the mathematical formulation used to model the evolution and dynamics of the universe, and to provide an up to date discussion of the big bang theory and structure and galaxy formation.		
Course Contents	The visible universe. Empirical basis for cosmological theories. The metric of the universe. The big bang models. Thermodynamics of the early universe. Primordial nucleosynthesis. The very early universe. Inflationary models. The cosmological constant problem. Structure and galaxy formation.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply physics principles to describe the observational/experimental aspects of cosmology - explain the observed phenomena of cosmology - demonstrate knowledge and discuss the underlying physical concepts associated with the cosmological evolution of the universe and with the dynamic interactive processes that take place in the universe		
Pre-requisites	Pass in PHYS2021 or PHYS2039		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests and homework assignments (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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.

Textbooks	Lecture notes provided by course instructor.
References	M. Lachieze-Rey: Cosmology: A First Course (Cambridge University Press, Cambridge, 1995) M. Rowan-Robinson: Cosmology (Clarendon Press, Oxford, 1996) P. Coles and F. Lucchin: Cosmology: The Origin and Evolution of Cosmic Structure (John Wiley, Chichester, 1995)
Course Website	http://www.physics.hku.hk/academic/courses/phys3034/index.html

PHYS3036 Interstellar medium (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr M H Lee, Physics		
Course Aim	Processes responsible for absorption and emission of continuum and line radiation from gas and dust in stellar atmospheres and interstellar space, and their astrophysical applications and implications.		
Course Contents	Topics include: gas, dust, atoms, molecules, radiation; physical and radiative properties of hydrogen, helium and heavier elements; hydrogen clouds, molecular clouds; HII regions, nebulae, supernovae, Cosmic Web		
Learning Outcomes	On successful completion of the course, students should be able to: - express what exists between stars in spiral and elliptical galaxies - apply physical principles to describe excitation/ionization and de-excitation/recombination of atoms and ions - recognize which process or processes occur or dominate in which object or phase of the interstellar medium		
Pre-requisites	Pass in PHYS2039 and PHYS2321 and PHYS2323		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		

Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and course work (50% weighting)		
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.		
Textbooks	S. Kwok: Physics and Chemistry of the Interstellar Medium (University Sciences Book, 2007)		
References	TBC		

PHYS3037 Selected topics in astrophysics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof K S Cheng, Physics		
Course Aim	To introduce students some current topics in astrophysics. It may be taken as a self-contained course or as background to research work in astrophysics.		
Course Contents	Brief review of thermodynamical equilibrium, radiation mechanisms and general relativity. Physics of shock wave. Properties of Cosmic rays. Physics of compact object stellar objects including black holes, white dwarfs, neutron stars and quark stars. Elements of cosmology: classical and relativistic dynamical theories, observational parameters.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply physics principles to describe the physical properties of various astrophysical systems - explain the observed phenomena of some selected astrophysical objects - demonstrate knowledge and discuss the underlying physical concepts associated with the astrophysical systems and their dynamic interactive processes		
Pre-requisites	Pass in PHYS2321 and PHYS2322 and PHYS2323		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including tests, homework assignments and presentations (50% weighting)		
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.		
Textbooks	Lecture notes provided by course coordinator		
References	S. L. Shapiro and S. A. Teukolsky: Black Holes, White Dwarfs and Neutron Stars (John Wiley, 1983) B. W. Carroll & D. A. Ostlie: An Introduction to Modern Astrophysics (Addison-Wesley Publishing Company, 2007, 2nd edition) Ta-Pei Cheng: Relativity, Gravitation and Cosmology - A Basic Introduction (Oxford, 2005)		
Course Website	http://www.physics.hku.hk/~phys3037/		

PHYS3038 Planetary science (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---

Course Co-ordinator	Dr M H Lee, Physics
Course Aim	This course provides students with a modern understanding of the properties of our Solar System and planetary systems around other stars and of the physical, chemical, and geological processes that govern them.
Course Contents	Terrestrial planets, giant planets, moons and minor bodies in our Solar System; planetary dynamics; energy transport; planetary atmospheres, surfaces, and interiors; planet formation; extrasolar planets.
Learning Outcomes	On successful completion of the course, students should be able to: - describe key aspects of our Solar System and extrasolar planetary systems acquired through observations and experiments - explain essential elements of the processes governing the properties of planetary bodies - apply physical principles to construct models for some basic aspects of the structure, formation and evolution of planetary bodies
Pre-requisites	Pass in PHYS2322 or PHYS2626
Offer in 2012 - 2013	Not offered; **Examination**: To be confirmed
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and tutorials
Assessment Method	One 2-hour written examination (50% weighting), and course work (50% weighting)
Course Grade	A+ to F
Grade Descriptors	see below
Textbooks	Lecture notes provided by course coordinator
References	I. de Pater and J. J. Lissauer: Planetary Sciences (Cambridge University Press, 2001) N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 2004)

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.

PHYS3040 Stellar physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof K S Cheng, Physics		
Course Aim	This course introduces the basic theory of stellar structure and evolution. It follows a vigorous mathematical treatment that stresses on the underlying physical processes. Knowledge in quantum mechanics and statistical mechanics will be advantageous.		
Course Contents	Definition of stars. The H-R diagram. Stellar structure equations. Polytropic model. Elementary stellar radiation processes. Simple stellar nuclear processes. Saha equation. Stability of stars. Zero-age main sequence stars and their evolution. The solar neutrino problem. Late stage evolution of stars. Supernova explosion. If time permits, special topics selected from below will be briefly mentioned: star formation, brown dwarfs and planets, AGB stars and planetary nebulae, binary stars and their evolution, Cepheid variables and theory of stellar pulsation, and introduction to helioseismology.		
Learning Outcomes	On successful completion of the course, students should be able to: - describe what is stars and to classify different types of stars - analytically calculate and solve problems related to the structure and evolution of stars including the use of stellar structure equations and Saha equations. - critically examine the physical processes occurring in stars and how these processes affect the evolution of stars - assess selected research papers in the field of stellar astrophysics		
Pre-requisites	Pass in PHYS2021 or PHYS2321 or PHYS2322 or PHYS2323		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessments such as presentation, short tests and homework assignments (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors	see below		

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.
Textbooks	Prialnik, D.: An introduction to the theory of stellar structure and evolution, 2nd ed., (CUP, 2010)	
References	Bowers, R. & Deeming, T.: Astrophysics I. Stars (Jones and Bartlett, 1984) Padmanabhan, T.: Theoretical astrophysics Volume 1 (CUP, 2000)	
Course Website	http://www.physics.hku.hk/~phys3040/	

PHYS3231 Computational physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof J Wang, Physics		
Course Aim	The aim of the course is to show how the power of computers enables a computational approach to solving physics problems to be adopted, which is distinct from, and complimentary to, traditional experimental and theoretical approaches. The material covered will found useful in any project or problem solving work that contains a strong computational or data analysis element. The course is designed such that a significant fraction of the students' time is spent actually programming specific physical problems rather than learning abstract techniques.		
Course Contents	The course will cover the following problems: Introductory Computational Physics and Computer Algebra, Integration and Differentiation, Interpolation and Extrapolation, Ordinary differential equations such as those of classical mechanics, Partial differential equations (such as the Maxwell's equations, the Diffusion equation, and the Schrodinger equation), Matrix methods (such as systems of equations and eigenvalue problems applied to Poisson's equation and electronic structure calculations), Monte Carlo and other simulation methods (such as the Metropolis algorithm and molecular dynamics), and several physics projects		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge in essential methods and techniques for numerical computation in physics - apply Monte Carlo method and other simulation methods to solve deterministic as well as probabilistic physical problems - employ appropriate numerical method to interpolate and extrapolate data collected from physics experiments - use appropriate numerical method to solve the differential equations governing the dynamics in physical systems - design and implement computer programs to solve physical problems by using Fortran, C++ or other software		
Pre-requisites	Pass in PHYS2321 and PHYS2322 and PHYS2323		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures; 12 hours of laboratory work and tutorials		
Assessment Method	One 2-hour written examination (40% weighting), and continuous assessment including homework assignments, laboratory works and one course project (60% weighting)		
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.
Textbooks	Lecture notes provided by course coordinator	
References	Samuel S. M. Wong: Computational Methods in Physics & Engineering (World Scientific) Nicholas J. Giordano and Nisao Nakanishi: Computational Physics (Pearson Education Inc.)	
Course Website	http://www.physics.hku.hk/~phys3231/	

PHYS3331 Electromagnetic field theory (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr X D Cui, Physics		
Course Aim	To provide those students who major in Physics with a fundamental knowledge of electrostatic and magnetism comprehensive concepts of electrodynamics and required training for physics related research.		

Course Contents	The course introduces Maxwell's equations, conservation Laws in electrodynamics, electromagnetic waves, potentials and fields, radiation and special relativity.
Learning Outcomes	On successful completion of the course, students should be able to: - review and discuss the fundamental physics in classical electrodynamics - apply Maxwell's equations to analyse complicated electrostatic and magnetic phenomena - evaluate how special relativity is incorporated in the study of electromagnetism - formulate and solve problems in electromagnetism using appropriate mathematical techniques
Pre-requisites	Pass in PHYS2321 and PHYS2322 and PHYS2323 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	36 hours of lectures and tutorials
Assessment Method	One 3-hour written examination (70% weighting), and continuous assessments including tests and homework assignments (30% weighting)
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
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.

Textbooks	D. J. Griffiths: Introduction to Electromagnetism (Prentice-Hall, 1999, 3rd ed.)
References	J. D. Jackson: Classical Electrodynamics (Wiley, 1998, 3rd ed) J. R. Reitz, F. J. Milford, & R. W. Christy: Foundations of Electromagnetic Theory (Addison-Wesley, 1992) P. Lorrain & D. R. Corson: Electromagnetic Fields and Waves (John Wiley, 1991)
Course Website	http://www.physics.hku.hk/~phys3331/

PHYS3332 Quantum mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof F C Zhang, Physics		
Course Aim	Introduces more advanced concepts of quantum mechanics. Together with PHYS2323, these will provide the basic knowledge of quantum mechanics to an undergraduate student.		
Course Contents	Angular momentum. Precession of electrons in magnetic field. Time-independent, non-degenerate and degenerate perturbation theory. Time dependent perturbation theory. Scattering, cross section, partial waves and Born approximation. Variational method.		
Learning Outcomes	On successful completion of the course, students should be able to: - review the perturbation theory and some other approximation methods on various quantum systems - apply physics principles to describe the physical properties of various quantum systems - demonstrate knowledge and discuss the underlying physical concepts associated with the selected quantum systems		
Pre-requisites	Pass in PHYS2323 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 3-hour written examination (50% weighting), and continuous assessment including tests and homework assignments (50% weighting)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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.
Textbooks	D. J. Griffiths: Introduction to Quantum Mechanics (Prentice Hall, 1995)	
References	S. Gasiorowicz: Quantum Physics (John Wiley & Sons, 2003)	
Course Website	http://www.physics.hku.hk/~phys3332/	

PHYS3336 Classical mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof S Q Shen, Physics		
Course Aim	The aim of this course is to introduce general methods of studying the dynamics of particle systems, through which students can acquire experience in using mathematical techniques for solving practical problems.		
Course Contents	Nonlinear problems. Many particle systems, Hamiltonian principles. Lagrangian formulation of dynamics; variational principle; generalized coordinates. Simple applications of Lagrangian equations; central force problem; motion of a rigid body; connection to quantum mechanics.		
Learning Outcomes	On successful completion of the course, students should be able to: - explain the difference between Newtonian mechanics and Analytic mechanics - solve the mechanics problems using Lagrangian formalism, a different method from Newtonian mechanics - discuss the connection between classical mechanics and quantum mechanics from Hamiltonian formalism - apply the Variational principle to real physical situations		
Pre-requisites	Pass in PHYS2626 and (PHYS2325 or MATH2401 or MATH2301 or MATH2403 or MATH2405)		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials.		
Assessment Method	One 2-hour written examination (70% weighting), and continuous assessments including tests and homework assignments (30% weighting)		
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.		
Textbooks	J.B. Marion: Classical Dynamics of Particles and Systems (Academic Press, 1965).		
References	H. Goldstein: Classical Mechanics (Addison-Wesley, 1972).		

PHYS3431 Experimental physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	4
Course Co-ordinator	TBC, Physics		
Course Aim	This course aims to introduce students to some of the more advanced techniques used in modern physics. At the same time the course will also demonstrate some of the important 20th century experiments found in modern physics textbooks. Students will undertake a small project to give them experience in hands on experimental physics.		
Course Contents	The following experiments will be demonstrated; Compton scattering, Rutherford scattering, Gamma ray spectroscopy, Mossbauer spectroscopy, Mass spectroscopy, Optical pumping, Optical Spectroscopy, Electron spin resonance, Anomalous specific heat measurement, Low temperature measurements		
Learning Outcomes	On successful completion of the course, students should be able to: - describe, analyse and compare a range of modern physics experiments - operate standard instrumentation used in nuclear, atomic and solid state physics experiments - apply appropriate techniques to collect, process and interpret data from experimental measurements - design and conduct experiments to evaluate physical principles and hypotheses - identify the problems in real experimental physics projects and formulate ways of solving them		
Pre-requisites	Pass in PHYS2321 and PHYS2322 and PHYS2323 and PHYS2626		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		

Teaching Hours	48 hours of laboratory works; 6 hours of lectures plus demonstrations
Assessment Method	Continuous assessment (100% weighting) including laboratory assessment, the keeping of laboratory logbook and writing a scientific style paper on project work.
Course Grade	A+ to F
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective lab / fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab / fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Textbooks	Preston D.W. and E.R. Dietz: The Art of Experimental Physics (Wiley, 2009)
References	Dunlap R.A: Experimental Physics: Modern Methods (Oxford University Press, 1988)
Course Website	http://www.physics.hku.hk/~phys3431/

PHYS3531 Physics project (12 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr H F Chau, Physics		
Course Aim	This course is designed for final year students who are interested in tackling a research project in physics. It provides students with the opportunity to comprehensively study a particular physics problem by themselves, either theoretical or experimental, under the supervision by an academic staff. The available projects are close to research in nature and are designed for prospective research students.		
Course Contents	Students interested in taking this course should contact their prospective supervisors in May to determine the contents and the nature of their projects in the coming academic year. They must get the approval from both the prospective supervisor and the course coordinator to take this course. Theoretical projects: The student will receive training in research literature reading and reviewing, and make investigation which is close to research work in nature, under the supervision of a staff member. The student may need to perform some original calculations; to fill in mathematical gaps of some sophisticated derivations, or a combination of both. In some cases, it may be necessary to use computers. Experimental projects: The student will carry out experiments in research laboratories under the supervision of a staff member. The student will receive a comprehensive training in advanced experimental techniques, including preparation of samples, determination of physical properties, measurement of small signals obscured by noise, laser, high-vacuum and low-temperature techniques etc. Wide reading of the relevant scientific literature and originality in experimental design are expected.		
Learning Outcomes	On successful completion of the course, students should be able to: - plan and execute a theoretical or experimental research project on a special topic in physics - review the knowledge of a physics problem in depth through literature review of books and research journals - criticise existing approaches for solving the selected problem. - describe and explain connections between physical principles and the study problem. - (for theoretical projects) identify the key issues of the problem and solve them independently, and compare the results with predictions or existing solutions - (for experimental projects) propose and execute physics experiments, analyze results and sources of errors of the experiment in comparison with predictions		
Pre-requisites	Pass in PHYS2321 and PHYS2323		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Small group instruction up to 4 scheduled hours per week over two semesters. Students will be assigned a supervisor who will provide individual instruction on a particular physics project.		
Assessment Method	Continuous assessment (100% weighting) in the form of a report of 40-60 pages (inclusive figures and references) and an oral presentation.		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic. B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.		

	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
References	Recommended reading material will be assigned by the project supervisor.	
Course Website	http://www.physics.hku.hk/~phys3531	

PHYS3987 Quantitative tools in physics (0 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	20
Course Co-ordinator	Dr F K Chow, Physics		
Course Aim	This course aims to enable students to use a few quantitative software packages that are commonly used in physics computation, experiment and presentation through mainly hands on projects. It is designed for students who want to have a better preparation for a physics and astronomy research career, in particular, those works that involve heavy computational and/or experimental elements. Successful completion of this pass/fail course can be regarded as having fulfilled the experiential learning requirements for astronomy, mathematics/physics, or physics majors.		
Course Contents	The use of a few software packages, such as LabView, Mathematica, Matlab and Origin, in solving and presenting physics problems. The choice of softwares may vary from year to year. Unlike an ordinary non-experiential learning course, students are expected to actively learn to use these softwares through guided and self studies in a project-based environment. Students are expected to apply what they have learnt to investigate and present physics problems such as complex dynamical systems, electric potential and ground state wave function of a particle.		
Learning Outcomes	On successful completion of the course, students should be able to: - recognise the techniques of using software packages for solving problems in physics - solve physical problems by using computer algebra and programming - use the computer to visualize the results in solving physics-related problems		
Pre-requisites	Pass in PHYS1414 and PHYS1415 and PHYS2627		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	14 hours of lectures and tutorials; 60 hours of hands on experience and self study; 60 hours of project work.		
Assessment Method	Two project reports and presentations (100% weighting)		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Textbooks	Patrick T. Tam: A Physicist's Guide to Mathematica (Academic Press, 2008, 2nd ed.) Stephen J. Chapman: Java for Engineers and Scientists (Prentice Hall, 2003, 2nd ed.)		
References	Eugene Don: Schaum's Outline of Mathematica, (McGraw-Hill, 2009, 2nd ed.) Kathy Sierra and Bert Bates: Head First Java (O'Reilly Media, Inc., 2005, 2nd ed.) Cay S. Horstmann and Gary Cornell: Core Java, Volume I--Fundamentals (Sun Microsystems Press, 2007, 8th ed.)		

PHYS3988 Physics internship (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F C C Ling, Physics		
Course Aim	This course aims to offer students the opportunities to gain work experience in the field of physics that are related to the major(s) of study.		
Course Contents	Students taking this course will work as an intern for at least 160 hours within the University or outside the University in a company, government department or NGO. The internship may be arranged by the Department or obtained by students themselves. In the latter case, the internship must be in a relevant field to the physics major (s) that the students are taking and prior approval by the course coordinator is required.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply what he/she has learned in his/her major to a real-life situation in either working or research environment - help to create, propose or design part of the project he/she is working on during the internship - employ effective technical and inter-personal communication skills		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		

Teaching Hours	No formal teaching. It is expected that students are to work at least 160 hours (lunch hour excluded) in at least 20 working days.
Assessment Method	A written report plus an oral presentation. Supervisors are required to assess the student based on their performance during the internship period (in the case of internships outside the University, the Internal Supervisor will assess the student based on the feedback of the External Supervisor). Satisfactory completion of this course can be counted towards the Experiential Learning requirement.
Course Grade	Pass/Fail
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.

PHYS6501 Computer controlled measurements in physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr A B Djurisic, Physics		
Course Aim	The aim of this course is to provide students with practical skills for designing and operating computer controlled measurement systems. In addition to measurement software development skills, the students will learn principles of operation of commonly used components in measurement systems for experimental condensed matter research.		
Course Contents	Topics include: Measurement uncertainties, standards, and calibration; Reproducibility of results and reporting measurement results; Signals and noise, two-wire and four-wire sensing, passive and active circuits, computer interfacing and Labview software, basics of dynamic systems, feedback and control, PID controllers. Light detectors, monochromators, spectrometers, photometry and radiometry. Measurements of electronic properties.		
Learning Outcomes	On successful completion of the course, students should be able to: - explain measurement uncertainties, concepts of repeatability and reproducibility, feedback and control. - identify possible sources of noise in measurements and propose methods to minimize the effect of noise. - compare different measurement techniques and instrumentation, recognize their limitations and appraise their suitability for a specific measurement. - write Labview programs to control measurement instrumentation.		
Pre-requisites	Pass in PHYS3331 or PHYS3431		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures, tutorials, and laboratory work		
Assessment Method	One 3-hour written examination (60% weighting), laboratory work (10% weighting), and course work or a mini-project (30% weighting)		
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.		
Textbooks	Lecture notes provided by course coordinator		
References	G. Olsson and G. Piani: Computer Systems for Automation and Control (Prentice Hall, 1992) J.A. Blackburn: Modern Instrumentation for Scientists and Engineers (Springer, 2001) J.G. Webster: The Measurement, Instrumentation, and Sensors Handbook (CRC Press, 1999) R.G.W. Johnson and R. Jennings: Labview Graphical Programming (McGraw-Hill, 2001)		

	L. Kirkup and B. Frenkel: An Introduction to Uncertainty in Measurement (Cambridge, 2006) J. Fraden: AIP Handbook of Modern Sensors: Physics, Designs, and Applications (AIP, 1995)
Course Website	http://www.physics.hku.hk/~phys6501/

PHYS6502 Advanced statistical mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof J Wang, Physics		
Course Aim	This course intends to introduce some advanced topics in the field of equilibrium statistical physics.		
Course Contents	Ensemble theory: the micro-canonical ensemble, the canonical ensemble, and the grand canonical ensemble. Quantum mechanical ensemble theory. Theory of simple gases, ideal Bose systems, ideal Fermi systems. Statistical mechanics of interacting systems. Some topics in the theory of phase transition may be selected.		
Learning Outcomes	On successful completion of the course, students should be able to: - discuss the various classical ensembles and quantum ensembles - solve the statistical mechanics problems using ensemble theory - explain the connection between classical statistical mechanics and quantum statistical mechanics - explain the concept of density matrix		
Pre-requisites	Pass in PHYS2322 and PHYS2627 and (PHYS3332 or PHYS3336)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials.		
Assessment Method	One 3-hour written examination (70% weighting), and continuous assessment including tests and homework assignments (30% weighting)		
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.		
Textbooks	Lecture notes provided by course coordinator.		
References	R.K. Pathria: Statistical mechanics M. Plischke and B. Bergersen: Equilibrium statistical physics.		

PHYS6503 Advanced electromagnetic field theory (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	50
Course Co-ordinator	Prof Z D Wang, Physics		
Course Aim	The aim of this course is to provide students with the advanced level of comprehending on the theory of classic electromagnetic field, enabling them to master key analytical tools for solving real physics problems.		
Course Contents	This course will introduce and discuss the following topics: Boundary-value problems in electrostatics and Green Function method, Electrostatics of Media, Magnetostatics, Maxwell's equations and conservation laws, Gauge transformations, Electromagnetic waves and wave guides.		
Learning Outcomes	On successful completion of the course, students should be able to: - analyse and solve various electrostatic and magnetostatic problems with Green's Function, - comprehend and explain many electromagnetic phenomena , - recognise and comprehend the important concepts of conservation laws and gauge transformations, which should be very helpful for doing research in future		
Pre-requisites	Pass in PHYS3331		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 3-hour written examination (80% weighting), and continuous assessment including tests and homework assignments (20% weighting)		
Course Grade	A+ to F		
Grade Descriptors	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course		

	A	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.
Textbooks	J.D. Jackson: Classical Electrodynamics (John Wiley & Sons, 1999)	
References	L.D. Landau and E.M. Lifshitz: Classical Theory of Fields (Pergamon, 1982)	
Course Website	http://www.physics.hku.hk/~phys6503/	

PHYS6504 Advanced quantum mechanics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof S Q Shen, Physics		
Course Aim	This course introduces postgraduates and senior undergraduates to theory and advanced techniques in quantum mechanics, and their applications to select topics in condensed matter physics.		
Course Contents	The course will cover the following topics: Dirac notation, quantum dynamics, the second quantization, symmetry and conservation laws, permutation symmetry and identical particles, perturbation and scattering theory, introduction of relativistic quantum mechanics		
Learning Outcomes	On successful completion of the course, students should be able to: - formulate and solve problems in quantum mechanics using Dirac notation - examine and predict the properties of identical quantum particles - argue the importance of symmetry and conservation laws in quantum mechanics - explain physical phenomena in the modern language of quantum mechanics; - analyse physical system in a quantum mechanical way - recognise the connection between relativity and quantum mechanics		
Pre-requisites	Pass in PHYS3332		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials		
Assessment Method	One 3-hour written examination (70% weighting), and continuous assessment including tests and homework assignments (30% weighting)		
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.
Textbooks	Lecture notes provided by Course Coordinator	
References	J. J. Sakurai: Modern Quantum Mechanics (Addison-Wesley, 1994); L. I. Schiff: Quantum Mechanics (McGraw-Hill, 1968)	
Course Website	http://www.physics.hku.hk/~phys6504/	

PHYS6505 Solid state physics (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof J Wang, Physics		
Course Aim	To provide students with an understanding of more advanced topics in selected areas of solid state physics.		
Course Contents	Bloch theory. Nearly free electrons and tight binding model. Band structure calculations for realistic systems. The		

	semi-classical model of electron dynamics. Ab initio total energy calculations and other advanced topics.		
Learning Outcomes	On successful completion of the course, students should be able to: - discuss various methods to calculate the band structures and the major approximations that have been used - discuss various minimization methods - discuss the concepts of density functional theory - explain the concept of first principle calculation and various approximations used		
Pre-requisites	Pass in PHYS2221 and PHYS2322 and PHYS3332		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials.		
Assessment Method	One 3-hour written examination (70% weighting), and continuous assessment including tests and homework assignments (30% weighting)		
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.		
Textbooks	Lecture notes provided by Course Coordinator.		
References	C. Kittel: Introduction to Solid State Physics (John Wiley, 1996); N.W. Ashcroft and D.N. Mermin: Solid State Physics (Holt, Rinehart and Winston, 1987).		

ENVS2006 Environmental radiation (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr J K C Leung, Physics		
Course Aim	In this course, students will learn about various kinds of radiations in the environment, the experimental techniques to detect them, the methods to trace them and to assess their hazard to the environment, and the ways to reduce the hazard in events of nuclear accidents or incidents.		
Course Contents	The course will cover naturally occurring radiation sources and man-made radiation sources including nuclear power plants; transport models for radionuclides in the environment; nuclear accidents and its impact to the environment; radiation risk assessment and emergency preparedness; techniques for measuring low level radioactivities; nuclear techniques in ecology; concept of radiation protection to human species and non-human species.		
Learning Outcomes	On successful completion of this course, students should be able to: - realise sources and transport of radionuclides in the environment - explain and assess the impact to the environment from the use of nuclear energies - detect and measure low level radioactivities in environmental samples - justify, optimize, and assess the risk of using radiation and nuclear technologies - compare and contrast the environmental impacts from nuclear energy and other forms of energy		
Pre-requisites	Pass in ENVS0001 or PHYS1417		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	N		
Teaching Hours	36 hours of lectures and tutorials, laboratory, presentations, and discussions		
Assessment Method	One 2-hour written examination (60% weighting), and continuous assessment including student presentations, assignments, and laboratory work (40% weighting)		
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. Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.		

	D	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to 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.
Textbooks	Merril Eisenbud and Thomas Gesell: Environmental Radioactivity: from Natural, Industrial, and Military Sources (Academic Press, 1997))	
References	Robert C. Morris: The Environmental Case for Nuclear Power (Paragon House, 2000) David Bodansky: Nuclear Energy - Principles, Practices and Prospects (American Institute of Physics Press, 1996))	

ENVS2010 Sustainable energy and environment (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr A B Djurisic, Physics		
Course Aim	In this course, the students will learn about sustainability and environmental impact of different energy technologies, including conventional energy sources as well as renewable and/or clean energy sources. The technological challenges, potential for future development, and environmental impacts (community, regional, and global) will be discussed.		
Course Contents	The course will cover energy production and use, environmental impact of energy use, fossil fuels and methods for making them more sustainable, clean fuels, electricity generation, renewable energy technologies (with emphasis on biomass, wind and solar energy), hydrogen, energy storage, and energy conservation.		
Learning Outcomes	On successful completion of this course, students should be able to: - define the concept of sustainable development - explain the challenges and potential for development of various energy technologies - compare the environmental impact of conventional and new energy technologies		
Pre-requisites	Pass in ENVS0001 or PHYS1417		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and tutorials, laboratory, presentations, and discussions		
Assessment Method	One 2-hour written examination (50% weighting), and continuous assessment including student presentations, assignments, and laboratory work (50% weighting)		
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.
Textbooks	Lecture notes provided by course coordinator	
References	Godfrey Boyle: Renewable Energy: Power for a Sustainable Future (Oxford University Press, 2003) G. Boyle, B. Everett, J. Ramage: Energy Systems and Sustainability: Power for a Sustainable Future (The Open University, 2003) R. M. Dell and D. A. J. Rand: Clean Energy (The Royal Society of Chemistry, 2004)	

SCNC2005 Career development for science students (0 credits)		Academic Year	2012
Offering Department	Faculty	Quota	200
Course Co-ordinator	Dr N K Tsing, Faculty		
Course Aim	The course is specially designed for second and third year Science students who wish to enhance their personal and career preparation skills through a variety of activities including lectures, practical workshops, small group discussion, role play and company visits, all of which aim to facilitate students in making informed career choices, provide training to enhance communication, presentation, time management skills, and enhance the students' employability.		
Course Contents	(1) Career Readiness: MBTI personality test, CV and interview preparation; (2) Career Exposure: networking, skills, company visits; (3) Skill-based Training: presentation skills, group discussion skills; (4) Communication & Adjustment: Time and stress management, work attitude, communication and relationship management.		
Learning Outcomes	On successful completion of the course, students should be able to: - comprehend the current employment market situations for science students - have enhanced their career and personal skills in communication, presentation, networking, time management, stress and relationship management for employment - apply knowledge learned in class and workshops to produce a CV and prepare for job applications and interviews - have visited at least one company and gained understanding of the nature and requirements of jobs related to the industry of that company		
Pre-requisites	Students are expected to have satisfactorily completed their Year 1 study.		
Offer in 2012 - 2013	1st sem 2nd sem	Examination	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	30 hours of lectures/workshops/out-campus practices and company visits.		
Assessment Method	By class attendance and course work (100%). Satisfactory completion of this course can be counted towards the Experiential Learning requirement. This course will be assessed on a Pass or Fail basis.		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate mastery of knowledge and skills required for attaining most of the course learning outcomes. Successfully meet all the following requirements: (i) attend at least 80% of the lectures and workshops of the course, (ii) attend at least one company visit, and (iii) pass in all assessment tasks of the course. Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Fail to meet one or more of the following requirements: (i) attend at least 80% of the lectures and workshops of the course, (ii) attend at least one company visit, and (iii) pass in all assessment tasks of the course.		
Course Website	http://www.hku.hk/science/current/cdp/career_deveopment_prog_0908.html		
Remarks	Students are expected to have satisfactorily completed their Year 1 study. 1. This course is exclusively for second and third year BSc students only. Priority would be given to those Year 3 students who have not satisfied any Experiential Learning requirements. 2. Students who take this course for satisfying the Experiential Learning requirement must take an additional 6-credit advanced level Science course in their primary Science major to complete the credit requirement.		

SCNC2988 Service learning internship (0 credits)		Academic Year	2012
Offering Department	Faculty	Quota	---
Course Co-ordinator	Dr N K Tsing, Faculty		
Course Aim	The course aims to offer students the opportunities to learn through active participation in organized service activities and to help develop their social consciousness and commitment so as to become a responsible citizen. Though it may not be related to their major of study, it would be of great benefits to students to apply their knowledge and scientific mind acquired in their study to provide meaningful services to society. It also aims to achieve some educational aims of the University, such as leadership and advocacy for the improvement of human condition and tackling novel situations.		
Course Contents	Students have to take on at least 120 hours of internship work either within the University or outside the University arranged by the Faculty. (1) Within the university: The student will be supervised by a staff member (Supervisor), working on a project or various tasks pertaining to the Course Aim as instructed by the Supervisor. (2) Outside the university: The student will work in an external agency on projects or tasks pertaining to the Course Aim. Examples of these agencies are NGO, or community service providers. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Faculty (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.		
Learning Outcomes	On successful completion of the course, students should be able to: - gain first hand work experience in providing services that meet actual society needs - acquire an understanding and appreciation of the services they engaged in the internship - develop their social consciousness, responsibility, and commitment - apply learned knowledge in solving practical problems that concern the society or community		
Pre-requisites	Students are expected to have satisfactorily completed their Year 1 study.		
Offer in 2012 - 2013	Summer	Examination	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal teaching, but it is expected that students are to work at least 120 hours of internship work (lunch hour excluded) in at least 15 working days in an organization arranged by the Faculty		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give a presentation on their internship experience. Supervisors are required to assess the students based on their performance during the internship period. The internal supervisor will assess the student based on the feedback by the External supervisor.		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate successful attainment of most of the course learning outcomes. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no attainment of the course learning outcomes. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Remarks	Students are expected to have satisfactorily completed their Year 1 study. Students engaging in the internship related to their major of study should enrol in the discipline specific internship course (e.g. CHEM3988 Chemistry Internship), not this course. Satisfactory completion of this course can be counted towards the EL requirement. Details of internship will be recorded on the transcript. This course will be assessed on Pass or Fail basis. Enrolment of this course is not conducted via the online course selection system and should be made through the Faculty office after approval has been obtained from the course coordinator.		

STAT0301 Elementary statistical methods (6 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Mrs G M Jing, Statistics and Actuarial Science		
Course Aim	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	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		
Learning Outcomes	On successful completion of the course, students should be able to: - select and use appropriate statistical methods to analyze data - perform statistical analysis with calculator and Microsoft Excel - understand and apply basic concepts of probability - gain familiarity with the fundamental concepts of random variables - make inferences on a population based on sample data - determine the most appropriate statistical method to use for a given statistical problem - write appropriate conclusions based on the statistical results - understand the basic principles of simple linear regression and correlation and their applications to practical problems		
Pre-requisites	E or above in HKCEE Math; and Not for student with E or above in AL PM; and Not for student with E or above in AS Math & Stat; and Not for students who have passed or enrolled in any of the following courses: STAT1801, STAT0302, STAT1301, STAT1306, ECON1003		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (75% weighting) and coursework (25% weighting) based on assignments, tutorials, and a class test		
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.		
Textbooks	Chiu W. K.: Basic Statistics (Pearson (Asia), 2007)		
References	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		
Remarks	Calculator: CASIO fx-50FH (This model has SD-MODE, REG-MODE, nCr and Normal Probability Function which is very suitable for this course.)		

STAT0302 Business statistics (6 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K S Chong, Statistics and Actuarial Science		
Course Aim	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	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		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the methods for describing sets of data - perform statistical analysis with calculator and Microsoft Excel - draw conclusions from data using numerical summaries - understand and apply basic concepts of probability - gain familiarity with the fundamental concepts of random variables - make inferences on a population based on sample data - determine the most appropriate statistical method to use for a given statistical problem - gain familiarity with the fundamental concepts of statistical inference as they apply to a variety of problems - understand the basic principles of simple linear regression and correlation and their applications to practical problems in today's society.		
Pre-requisites	For Business School students only; and Not for students who have passed or enrolled in any of the following courses: STAT0301, STAT1301, STAT1306, STAT1801, ECON1003		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a class test		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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.

Textbooks	Gerald Keller: Managerial Statistics (Cengage Learning, 2009, 8th edition)
References	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
Remarks	Nil

STAT1301 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		
Course Aim	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	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.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the basic concepts in probability theory - gain some insights to statistics and inference - solve real-world problem by using probability calculations - pursue their further studies in statistics		
Pre-requisites	(E or above in AL PM; or Pass in MATH0211); and Not for students who have passed in STAT1306, or have already enrolled in this course; and Not for students who have passed in STAT1801, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		

Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorial and a class test
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.
References	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.hku.hk
Remarks	1. For students admitted in 2006 or before - AL PM or AS Math & Stat or equivalent (Students taking or having taken STAT0301 or STAT0302 or STAT1306 or STAT1801 are not allowed to take this course) 2. For students admitted in 2007 - AL PM or AS Math & Stat or STAT0301 or STAT0302 or (students taking or having taken MATH0211). (Students taking or having taken STAT1306 or STAT1801 are not allowed to take this course.) 3. For students admitted in 2008 or thereafter - AL PM or MATH0211. (Students taking or having taken STAT1306 or STAT1801 are not allowed to take this course.)

STAT1302 Probability and statistics II (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr J F Yao, Statistics and Actuarial Science		
Course Aim	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	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;		
Learning Outcomes	On successful completion of the course, students should be able to: - apprehend the objectives of statistics and its relation to probability theory; - relate a real-life problem to a formal framework for statistical inference; - conduct standard parametric statistical inference by means of estimation and hypothesis testing; - reckon the general applicability of statistics in a broad range of subject areas.		
Pre-requisites	Pass in STAT1301		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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. Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes.		

	Fail	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.
References	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	

STAT1303 Data management (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr C W Kwan, Statistics and Actuarial Science		
Course Aim	This course is designed for students who want to learn a statistical software (SAS) for data management and elementary data analysis. This course focuses on using SAS to manage data set input and output, work with different data types, manipulate and transform data, perform random sampling and descriptive data analysis, and create summary reports and graphics.		
Course Contents	Data management system for statistical projects. Data validation and cleaning techniques. SAS programming topics, including the following: Data set input and output. Working with different data types. Data manipulation. Data transformation. File manipulation. File management. Data reporting, summarization, presentation and graphics. Basic data analysis.		
Learning Outcomes	On successful completion of the course, students should be able to - access online help and document - use Data Step to create data files - summarize data by PROC MEANS, PROC FREQ, and PROC UNIVARIATE - work with numeric, character, and date variables and functions in Data Step - perform conditional processing in Data Step - perform iterative processing in Data Step - work with arrays in Data step - restructure SAS data sets by Data Step and PROC TRANSPOSE - subset and merge data sets by Data Step and PROC APPEND - present data in a readable way by PROC TABULATE - produce high-resolution graphics by PROC SGPLOT - produce HTML output by ODS		
Pre-requisites	(E or above in HKCEE Math or AS Math & Stat or AL PM); and Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments, tutorials and class test(s)		
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.		
References	Cody, R.P.: Learning SAS by Example: A Programmer's Guide (North Carolina: SAS Institute Inc., 2007) SAS: SAS Certification Prep Guide: Base Programming for SAS 9. Third Edition. (SAS Institute Inc., 2011) Bailer, J.: Statistical Programming in SAS. North Carolina: (SAS Institute Inc., 2010) Delwiche, L. and Slaughter, S.: The Little SAS Book: A Primer. Fourth Edition. (SAS Institute Inc, 2008) Cody, R. P.: Cody's Data Cleaning Techniques Using SAS System (North Carolina: SAS Institute, 2008, 2nd edition) SAS: Step by Step Programming with Base SAS Software (North Carolina: SAS Publishing, 2001)		
Course Website	webct.hku.hk		

STAT1304 Design and analysis of sample surveys (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---

Course Co-ordinator	Ms O T K Choi, Statistics and Actuarial Science
Course Aim	The use of sample surveys as a means to collect raw data for the compilation of statistics has become popular both in the public and private sectors. The conduct of sample surveys involves a range of activities, including overall survey design, design of sampling schemes and questionnaires, planning of fieldwork, logistical matters, scheduling, and implementation of surveys. The course provides a general overview of the process of design, implementation and analysis of results of sample surveys and due details on various aspects.
Course Contents	The course will discuss various sources of raw data and provide a general overview of the main aspects of the survey process. Some emphasis will put on how to implement a good quality and trustworthy survey conducted by the survey organization. An introduction will be given to commonly used statistics that are produced through the survey approach. Survey sampling will be covered in considerable detail. Topics taught will include: simple random sampling; systematic sampling; stratified sampling; cluster sampling; multi-stage sampling; post-stratification; double sampling; estimation methods ;biases and non-sampling errors; non-responses; and missing data.
Learning Outcomes	On successful completion of the course, students should be able to: - have a general grasp of the ethical, technical and administrative issues in the conduct of sample surveys - demonstrate knowledge and understanding of the various steps to be taken in the planning and implementation of sample surveys - design different sample schemes and select the most efficient and suitable one for adoption for a particular survey - make statistical inference on parameters based on sample statistics - judge whether the statistics presented by other survey takers are trustworthy
Pre-requisites	(E or above in HKCEE Math or AS Math & Stat or AL PM); and Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801
Offer in 2012 - 2013	2nd sem — **Examination**: May
Offer in 2013 - 2014	Y
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a test
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.
References	R. L. Scheaffer, W. Mendenhall, & R. L. Ott: Elementary Survey Sampling (Duxbury Press, 1996, 5th edition) S. L. Lohr: Sampling: Design and Analysis (Duxbury Press, 1996) L. Kish: Survey Sampling (John Wiley & Sons, Inc., 1995) P. Salant & D. A. Dillman: How to Conduct Your Own Survey (John Wiley & Sons, Inc., 1994) W. G. Cochran: Sampling Techniques (John Wiley & Sons Ltd., 1997)
Course Website	webct.hku.hk
Remarks	Other references: Census and Statistics Department, Hong Kong SAR: Annual Digest of Statistics (latest release)

STAT1306 Introductory statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E K F Lam, Statistics and Actuarial Science		
Course Aim	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	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.		
Learning Outcomes	On successful completion of the course, students should be able to: - compute different measures of central tendency and dispersion. - make use of the basic probability theory and techniques to solve practical problem. - know how to construct confidence intervals and use hypotheses testing to carry out inference on the population. - use linear regression and correlation methods to solve problems in science and in social and business environment.		

Pre-requisites	(E or above in AL PM or AS Math & Stat) or ((C or above in AL Phys) or (Pass in MATH0801) or (Pass in MATH0802) or (Pass in MATH0201, or already enrolled in this course) or (Pass in MATH1804, or already enrolled in this course)); and Not for students who have passed or already enrolled in any of these courses: STAT0301, STAT0302, STAT1301, STAT1801		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a test		
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.		
Textbooks	Miller, I. and Miller, M.: John E. Freund's Mathematical Statistics with Applications (Prentice Hall, New Jersey, 2004, 7th edition)		
References	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		
Remarks	Students who intend to major in "Risk Management" or "Statistics" should take STAT1301 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)		

STAT1323 Introduction to demographic and socio-economic statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Ms L M S Kwan, Statistics and Actuarial Science		
Course Aim	The course is an introduction to the basic methods for studying demographic and socio-economic statistics, which provide quantitative information on population size and structure, as well as major aspects of citizens' lives. The course aims at providing students with 1) basic knowledge including the underlying principles of the pertinent methods and statistical indicators; and 2) skills in the statistical descriptions of a territory and their interpretation and application to planning, policy-making and commercial endeavours.		
Course Contents	Population structure, fertility, mortality, migration, life tables, population projections; Social statistics on education, health, housing, labour, and other social characteristics; Economic statistics on national accounts, prices indices, trade statistics; Sources, theory and methods of official statistics; Examples would be especially drawn from Hong Kong, and Mainland China.		
Learning Outcomes	On successful completion of the course, students should be able to: - Describe and interpret major official & other publicly disseminated socio-economic statistics of a territory; - Further appraise and analyse the socio-economic well-being of a territory with particular reference to Hong Kong and mainland China - Predict a future situation by assimilating and deriving from appropriate statistics - Critically assess statistics reporting		
Pre-requisites	(E or above in HKCEE Math or AS Math & Stat or AL Pure Maths); and Pass or already enrolled in any of these courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801; and Not for students who have already passed in STAT1305 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework (25% weighting) based on assignments, tutorials and		

	a test
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.
References	Annual Digest of Statistics (Census & Statistics Department, Hong Kong SAR, latest issue) (Main Reference) Giovannini E.: Understanding Economic Statistics - an OECD Perspective (OECD, 2008) Pollard A. H., Yusuf F., & Pollard G. N.: Demographic Techniques (Pergamon Press, 1990, 3rd edition) Preston S, Heuveline P, Guillot M: Demography: Measuring and Modelling Population Process (Wiley-Bladwell, 2000)
Course Website	webct.hku.hk

STAT1801 Probability and statistics: foundations of actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr Y K Chung, Statistics and Actuarial Science		
Course Aim	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	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		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the mathematical theory underlying the modern practice of statistics - develop skills in probabilistic analysis for problems involving randomness - apply techniques in probability and statistics to solve actuarial science problems		
Pre-requisites	(E or above in AL Pure Math or AS Math & Stat; or (Pass in MATH1813, or already enrolled in this course); and Not for students who have passed or enrolled in any of these courses: STAT0301, STAT0302, STAT1301, STAT1306.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a class test		
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.
Textbooks	I. Miller & M. Miller: John E. Freund's Mathematical Statistics with applications (Pearson Education International, 2004, 7th edition)	
References	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)	
Course Website	webct.hku.hk	
Remarks	Other References: D. Wackerly, W. Mendenhall III & R. Scheaffer: Mathematical Statistics with Applications (2008, 7th edition)	

STAT1802 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		
Course Aim	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	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.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the fundamental concepts of financial mathematics. - learn standard actuarial notations for a variety of annuities. - do simple discounted cashflow analysis using basic annuities. - learn the operations of some commonly-encountered financial instruments such as bonds, mortgages, short sales, and so on. - quote interest in various modes and determine interest rate based on a series of financial transactions. - deal with Exam FM of the Society of Actuaries.		
Pre-requisites	(E or above in AL Pure Math or AS Math & Stat); and (Pass in STAT1302, or already enrolled in this course; or Pass in STAT1801, or already enrolled in this course); and Not for students who have passed in STAT2315, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and class tests		
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.	
Textbooks	Kellison, S. G.: The Theory of Interest (Irwin: Illinois, 2008, 3rd edition)		
References	Broverman, S. A.: Mathematics of Investment and Credit (ACTEX Publications - Mad River Books: Connecticut, 2004, 3rd edition)		
Course Website	webct.hku.hk		

STAT2301 Linear statistical analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof T W K Fung, Statistics and Actuarial Science		

Course Aim	The analysis of variability is mainly concerned with locating the sources of the variability. Many statistical techniques investigate these sources through the use of 'linear' models. This course presents the theory and practice of these models.
Course Contents	(1) Simple linear regression: least squares method, analysis of variance, coefficient of determination, hypothesis tests and confidence intervals for regression parameters, prediction. (2) Multiple linear regression: least squares method, analysis of variance, coefficient of determination, reduced vs full models, hypothesis tests and confidence intervals for regression parameters, prediction, polynomial regression. (3) One-way classification models: one-way ANOVA, analysis of treatment effects, contrasts. (4) Two-way classification models: interactions, two-way ANOVA for balanced data structures, analysis of treatment effects, contrasts, randomised complete block design. (5) Universal approach to linear modelling: dummy variables, 'multiple linear regression' representation of one-way and two-way (unbalanced) models, ANCOVA models, concomitant variables. (6) Regression diagnostics: leverage, residual plot, normal probability plot, outlier, studentized residual, influential observation, Cook's distance, multicollinearity, model transformation. (7) Generalized linear models: exponential family, model fitting, analysis of deviance, analysis of regression coefficients, logistic regression, Poisson data, multinomial response data.
Learning Outcomes	On successful completion of the course, students should be able to: - Understand linear regression model with one or multiple independent variables. - Understand ANOVA models for one and two factors. - Understand general linear model with categorical and continuous independent variables.
Pre-requisites	Pass in STAT1302; and Not for students who have passed in STAT2804, or have already enrolled in this course.
Offer in 2012 - 2013	1st sem — **Examination**: Dec
Offer in 2013 - 2014	Y
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
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.

Textbooks	Michael H Kutner, Christopher J. Nachtsheim, John Neter, William Li: Applied Linear Statistical Models (McGraw-Hill/Irwin; 5th edition)
References	Berry, D. A. & Lindgren, B. W.: Statistics: Theory and Methods (Duxbury Belmont, 1996) Draper, N. R. & Smith, H.: Applied Regression Analysis (Wiley, New York, 1998) Krzanowski, W. J.: An Introduction to Statistical Modelling (Arnold, London, 1998) Montgomery, D. C. & Peck, E. A.: Introduction to Linear Regression Analysis (Wiley, New York, 1992)
Course Website	webct.hku.hk

STAT2302 Statistical inference (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		
Course Aim	This course covers the advanced theory of point estimation, interval estimation and hypothesis testing. Using a mathematically-oriented approach, the course provides a solid and rigorous treatment of inferential problems, statistical methodologies and the underlying concepts and theory. It is suitable in particular for students intending to further their studies or to develop a career in statistical research.		
Course Contents	1. Paradigms of inference: frequentist, Bayesian, Fisherian. 2. Decision theory: loss function; risk; decision rule; admissibility; minimaxity; unbiasedness; Bayes' rule. 3. Estimation theory: exponential families; likelihood; sufficiency; minimal sufficiency; ancillarity; completeness; UMVU estimators; information inequality; large-sample theory of maximum likelihood estimation. 4. Hypothesis testing: uniformly most powerful test; monotone likelihood ratio; unbiasedness; UMP unbiased test; maximal invariants; most powerful invariant test; large-sample theory of likelihood ratio.		
Learning Outcomes	On successful completion of the course, students should be able to: - form a panoramic view of classical developments in mathematical statistics; - gain thorough insight into the essentials of statistical inference; - build a solid foundation for future research studies in statistics and related areas.		
Pre-requisites	Pass in STAT1302 or STAT2802		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		

Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test
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, 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.
References	Berry, D. A. & Lindgren, B. W.: Statistics: Theory and Methods (Duxbury, Belmont, 1996) Bickel, P. J. & Doksum, K. A.: Mathematical Statistics: Basic Ideas and Selected Topics, Vol. 1 (Prentice Hall, Upper Saddle River, N.J., 2001) Freund, J. E.: Mathematical Statistics (Prentice Hall, Englewood Cliffs, N.J., 1992) Hogg, R. V. & Craig, A. T.: Introduction to Mathematical Statistics (Macmillan, New York, 1989) Pace, L. & Salvan, A.: Principles of Statistical Inference: from a neo-Fisherian perspective (World Scientific: Singapore, 1997). Young, G.A. & Smith, R.L.: Essentials of Statistical Inference (Cambridge University Press: Cambridge, 2005).
Course Website	webct.hku.hk

STAT2303 Probability modelling (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K S Chong, Statistics and Actuarial Science		
Course Aim	This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.		
Course Contents	Introduction to probability theory, conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of interarrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).		
Learning Outcomes	On successful completion of the course, students should be able to: - apply the conditioning method to calculate the mean and probability - understand the essentials of Markov chains, the Poisson process, and Brownian motion - understand how stochastic models can be applied to the study of real-life phenomena		
Pre-requisites	Pass in STAT1301; and Not for students who have passed in MATH2603, or have already enrolled in this course; and Not for students who have passed in STAT2803, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test		
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.		
Textbooks	S. M. Ross: Introduction to Probability Models (9th edition)		
Course Website	webct.hku.hk		

STAT2304 Design and analysis of experiments (6 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Li, Statistics and Actuarial Science		
Course Aim	Scientific research often requires proper design and analysis of experiments. This course aims to introduce the basic principles of experimental design; to explain the concepts and to develop the statistical skills in model-based analysis of experiment.		
Course Contents	Basic principles and guidelines for designing experiments. Analysis for experiments with a single factor, randomised block, crossed and nested factorial structure. Balanced incomplete factorial experiments. Latin squares and related designs. Fixed/random effects models.		
Learning Outcomes	On successful completion of the course, students should be able to: - develop a conceptual understanding of experimental design, - acquire the fundamental statistical tools of experimental design and the understanding to use them appropriately, - select appropriate experimental designs for different problems, - select appropriate statistical model and to know how to validate the model.		
Pre-requisites	Pass in STAT1302 or STAT2802 or STAT2311		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test		
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.		
Textbooks	D. C. Montgomery: Design and Analysis of Experiments (Wiley, 1997, 4th edition)		
References	D. R. Cox: Planning of Experiments (Wiley, 1958) A. L. Edwards: Experimental Design in Psychological Research (Harper & Row, 1985, 5th edition) G. A. Ferguson & Y. Takane: Statistical Analysis in Psychology and Education (McGraw Hill, 1989, 6th edition) C. R. Hicks & K. V. Turner Jr.: Fundamental Concepts in the Design of Experiments (Oxford, 1999, 5th edition) P. W. M. John: Statistical Design and Analysis of Experiments (Macmillan, 1971) R. L. Moson, R. F. Gungst, & J. L. Hess: Statistical Design and Analysis of Experiments (Wiley, 1989)		
Course Website	webct.hku.hk		

STAT2305 Quality control and management (6 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K S Chong, Statistics and Actuarial Science		
Course Aim	The successful control of quality in production is a matter of primary importance to a company's prosperity. This course provides an overview of quality compromise which involves both the producer and the consumer. It presents a variety of statistical solutions including control charts, acceptance and sequential sampling plans, reliability, and life-testing. Contemporary quality management systems such as total quality control, zero defects, six-sigma, and ISO-9000 will be introduced. The student is brought to the frontier of today's quality control and management ideas.		
Course Contents	Probability distributions and their applications, process variability, sampling and statistical inference. Process control, variables and attributes control charts. Operating characteristic curves. Single, double and sequential sampling plans. MIL-STD-105D and Dodge-Romig schemes. Variables sampling. Reliability and life-testing. Elementary experimental designs. Management of quality control, total quality control, zero defects, six-sigma, and ISO 9000.		
Learning Outcomes	On successful completion of the course, students should be able to: - Appreciate the practicality of statistical concepts and methods in general; - Understand how certain specific statistical methods can benefit various production situations; - Know the traditional and modern systems of quality management.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or STAT2802		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		

Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test
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.
References	A. J. Duncan: Quality Control and Industrial Statistics (Irwin, Homewoor, 1986, 5th edition) D. C. Montgomery: Statistical Quality Control (New York: Wiley, 1996, 3rd edition) J. Banks: Principles of Quality Control (New York: Wiley, 1989) E. L. Grant & R. S. Leavenworth: Statistical Quality Control (New York: McGraw-Hill, 1988, 6th edition) I. D. Hill: An Introduction to Sampling Inspection (The Institute of Engineering Inspection Monograph, London, 1961) G. B. Wetherill: Sampling Inspection and Quality Control (London: Methuen, 1977, 2nd edition) A. V. Feigenbaum: Total Quality Control (New York: McGraw-Hill, 1983, 3rd edition)
Course Website	webct.hku.hk

STAT2306 Business logistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Ms O T K Choi, Statistics and Actuarial Science		
Course Aim	Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportations and deciding a location for a new factory. This course addresses the business applications of logistics.		
Course Contents	In this course, students will apply the analytical skills with aid of computer techniques in solving the business logistic problems. Topics include optimization techniques applied in allocation of resources, financial planning, transportation, assignment, inventory control and queuing problems.		
Learning Outcomes	On successful completion of the course, students should be able to: - Solve linear programming with Graphical approach, Simplex method and hands-on Excel Solving function - Set-up and solve network flow problems using least-cost approach, MODI method and Vogel's approximation - Understand decision theory and its applications - Evaluate the cost and effectiveness of service systems		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801; and Not for students who have passed MATH2901, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework (25% weighting) based on assignments, tutorials and a class test		
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.		
References	B. Render, R. Stair, M. Hanna: Quantitative Analysis for Management, 10th edition, Pearson Wayne L. Winston: Operations Research, 4th edition, Thomson Learning H. Taha: An Introduction to Operations Research, 8th edition, Pearson International Edition F.S. Hillier and G, J. Lieberman: An Introduction to Operations Research		

	Robert F.V. Anderson, Holt, Rinehart and Winston: Introduction to Linear Algebra
Course Website	webct.hku.hk

STAT2307 Statistics in clinical medicine and bio-medical research (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Yin, Statistics and Actuarial Science		
Course Aim	In clinical research, medical data are often observed which motivates the application of statistical methodology to the clinical observational and decision-making process. Also, statistical problems often arise from clinical trial designs. It involves phase I, II, III and IV clinical trial designs, both Bayesian and frequentist approaches, sample size and power calculation. No knowledge in biology or medicine is assumed; the course provides the necessary biomedical background when the statistical problems are introduced.		
Course Contents	The contents of the course include contingency tables, regression models, survival analysis, categorical data analysis, Bayesian designs, dose-finding methods, sample size and power calculation, phase I, II and III trial designs, hypothesis testing, adaptive designs.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the basic concepts in medical statistics - design clinical trials and compute sample sizes - conduct statistical inference and apply regression models - solve medical problems by using various statistical tests		
Pre-requisites	Pass in STAT1302 or STAT2802		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
References	J. Aitchison, J. W. Kay & I. J. Lauder: Statistical Concepts and Applications in Clinical Medicine (Chapman & Hall/CRC, 2004) J. Aitchison & J. Dunsmore: Statistical Prediction Analysis (Cambridge University Press, 1976) P. Armitage: Statistical Methods in Medical Research (Oxford: Blackwell, 1971) P. Armitage: Sequential Medical Trials (Oxford: Blackwell, 1975, 2nd edition) D. Altman: Practical Statistics for Medical Research (London: Chapman & Hall, 1991) N. E. Breslow & N. E. Day: Statistical Methods in Cancer Research Volume 1 - The analysis of case-control studies (Lyon: IARC, 1980) D. R. Cox & E. J. Snell: The Analysis of Binary Data (London: Chapman and Hall, 1989, 2nd edition) D. R. Cox & D. V. Hinkley: Theoretical Statistics (London: Chapman and Hall, 1974)		
Course Website	webct.hku.hk		
Remarks	Other references: E. K. Harris & A. Albert: Survivorship Analysis for Clinical Studies (New York: Marcel Dekker, 1991) B. Jones & M. G. Kenward: Design and Analysis of Cross-Over Trials (London: Chapman and Hall, 1990) B. J. T. Morgan: Analysis of Quantal Response Data (London: Chapman and Hall, 1992) S. J. Pocock: Clinical Trials. A Practical Approach (Chickestes: John Wiley & Sons, 1991) P. McCullagh & J. A. Nelder: Generalised Linear Models (London: Chapman and Hall, 1989, 2nd edition)		

STAT2308 Statistical genetics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof T W K Fung, Statistics and Actuarial Science		
Course Aim	This course aims to provide students with a fundamental knowledge of DNA profiling in human identification and genetic epidemiology in gene mapping and to understand how statistical theory and methods are applied to solve forensic DNA and genetic problems.		
Course Contents	This course will cover the following topics: background of genetics; Mendelian inheritance; Hardy-Weinberg equilibrium; linkage equilibrium; chi-square test; likelihood ratio test; exact test; match probability; paternity testing		

	and kinship analysis; DNA mixed stain; relatedness; population structure; gene mapping; parametric linkage analysis; non-parametric linkage analysis; linkage disequilibrium; association designs; case-control analysis; family-based association study; quantitative traits.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the fundamental principles in statistical DNA forensics and genetic epidemiology - know the usefulness and possible limitations of statistical methodology in human identification and gene mapping - provide statistical solutions to specific problems in the field		
Pre-requisites	Pass in STAT1302 or STAT2802		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
References	Klug, W. S. and Cummings, M. R.: Essentials of Genetics (Prentice Hall, 2002) Ott, J.: Analysis of Human Genetic Linkage (The Johns Hopkins University Press, 1999, 3rd ed.) Ziegler, A. and Konig, I.R.: A Statistical Approach to Genetic Epidemiology (Wiley-VCH, 2006) Evett, I. W. and Weir, B. S.: Interpreting DNA Evidence (Sinauer Associates, Inc. Publishers, 1998) Fung, W. K. and Hu, Y. Q.: Statistical DNA Forensics: Theory, Methods and Computation (Wiley, Sussex, 2008)		
Course Website	webct.hku.hk		

STAT2309 The statistics of investment risk (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Mr K P Wat, Statistics and Actuarial Science		
Course Aim	Most investments involve some risk. The decision to invest or not is usually made against a background of uncertainty. Whilst prediction of the future is difficult, there are statistical modelling techniques which provide a rational framework for investment decisions, particularly those relating to stock markets and the markets for interest rates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents the prevailing statistical theories for prices and price-change in these vital markets.		
Course Contents	Concept of market efficiency, mean-variance portfolio theory, capital asset pricing model, arbitrage pricing theory, portfolio performance and management, behavioural finance.		
Learning Outcomes	On successful completion of the course, students should be able to: - measure risk and return of portfolios; - apply different approaches in constructing optimal investment portfolios; - explain and apply asset pricing models and evaluate investment performance; - explain the concepts of market efficiency and apply appropriate testing procedures to assess different forms of market efficiency.		
Pre-requisites	Pass in STAT1302 or STAT1306 or STAT2311 or STAT2314; and Not for students who have passed in FINA2802, or have already enrolled in this course. (Any student who has already passed in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1801 in 2009-10 or before can still apply for this course.) (Not available to Actuarial Science students)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (70% weighting) and coursework assessment (30% weighting) based on assignments, tutorials and class test(s).		
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.
References	Z. Bodie, A. Kane & A. J. Marcus: Investments and Portfolio Management (McGraw-Hill, 2011, 9th edition) E. J. Elton, M. J. Gruber, S. J. Brown & W. N. Goetzmann: Modern Portfolio Theory and Investment Analysis (John Wiley, 2011, 8th edition) R. A. Defusco, D. W. McLeavey, J. E. Pinto & D. E. Runkle: Quantitative Investment Analysis, CFA Institute Investment Series (New Jersey: Wiley, 2007, 2nd edition) F. J. Fabozzi, S. M. Focardi & P. N. Kolm: Financial Modelling of the Equity Market: From CAPM to Cointegration (New Jersey: Wiley, 2006) D. Ruppert: Statistics and Finance: An Introduction (New York: Springer, 2004) D. G. Luenberger: Investment Science (Oxford University Press, 1998)	
Course Website	webct.hku.hk	
Remarks	References - Cont'd L. S. F. Young & R. C. P. Chiang: The Hong Kong Securities Industry (The Stock Exchange of Hong Kong, 1997, 3rd edition)	

STAT2310 Risk management and insurance (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr R W L Wong, Statistics and Actuarial Science		
Course Aim	To provide knowledge on basic risk and its management, as well as basic financial planning though insurance products, to students. To allow students to understand the statistical, financial and legal principles underlying the techniques for managing the insurable risks faced by organisations and individuals. Aiming at students who have minimal background in quantitative methods, it involves very minimal quantitative calculations and is not available to students majoring in Actuarial Science.		
Course Contents	The course introduces and explains: - risk in our society, - insurance and risk, - introduction to risk management, - fundamental legal principles, and analysis of insurance contracts, - life insurance, their contractual provisions, - individual health insurance coverages.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the general risks faced by organisations and individuals and the generic risk management principle, - demonstrate knowledge and understanding of the underlying financial and legal principles of the insurance industry, - understand how risk can be managed through insurance, - compare and contrast different types of commercial and personal insurance products, - plan for and arrange their own personal insurance needs.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801. (Not available to Actuarial Science students)		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
Textbooks	Rejda, G. E.: Principles of Risk Management and Insurance (Pearson Addison Wesley, 10th edition)		
References	Trieschmann, J., Hoyt, R. E. and Sommer, D.: Risk Management and Insurance (South-Western, 2005, 12th		

	edition)
Course Website	webct.hku.hk

STAT2311 Computer-aided data analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E K F Lam, Statistics and Actuarial Science		
Course Aim	A wide range of statistical analyses and methods are presented using data sets from social sciences research and scientific studies. Measuring uncertainty, describing patterns of variability and the inter-relationship between several variables are essential aspects of scientific investigations that require good understanding of statistics. This computer-oriented but non-mathematical course develops the important concepts and methods of statistics. The course makes extensive use of computers through the user friendly statistical software JMP. No knowledge of a programming language is required.		
Course Contents	Data exploration, formulation of testable hypotheses, the evaluation of evidence and forecasting on the basis of past experience.		
Learning Outcomes	On successful completion of the course, students should be able to: - summarize and describe the quantitative and qualitative data using some simple statistical measures, - describe the patterns of variability and the inter-relationship between several continuous or discrete variables, - carry out simple statistical analyses based on some real life data, formulate testable hypotheses, make appropriate statistical inferences and make interpretations on the findings.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1306; and Not for students who have passed in STAT1301, or have already enrolled in this course; and Not for students who have passed in STAT1801, or have already enrolled in this course; and Not for students who have passed in STAT3304, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments, practical work, and a term test		
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.		
Textbooks	G. C. Canavos & D. M. Miller: An Introduction to Modern Business Statistics (Duxbury Press, 1999, 2nd edition)		
References	E. R. Babbie: The Practice of Social Research (Wadsworth Pub. Co., Belmont, 7th edition) J. E. Freund & G. A. Simon: Statistics - A First Course (Prentice Hall, 7th edition) R. Hooke: How to tell the liars from the Statisticians (Marcel Dekker) D. G. Kleinbaum, L. L. Kupper, & K. E. Muller: Applied Regression Analysis and Other Multivariable Methods (Duxbury Press, 1988, 2nd edition) D. M. Levine, M. L. Berenson, & D. Stephan: Statistics for Managers - Using Microsoft Excel (Prentice Hall, 2nd edition)		
Course Website	webct.hku.hk		
Remarks	CogSc or CompSc students having taken STAT1301 should obtain approval from the dept. Other reference: J. T. McClave & F. H. Dietrich II: Statistics (Maxwell Macmillian, 5th ed.) M. R. Middleton: Data Analysis Using Microsoft EXCEL 5.0 (Duxbury) J. Neter, W. Wasserman, & G. A. Whitmore: Applied Statistics (Allyn and Bacon) P. Newbold: Statistics for Business and Economics (Prentice-Hall, International Editions, 3rd ed.) I. Olkin, L. J. Gleser, & C. Derman: Probability Models and Applications (Prentice-Hall, 2nd ed.) J. G. Peatman: Introduction to Applied Statistics (Harper)		

STAT2312 Data mining (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	48
Course Co-ordinator	Dr G C S Lui, Statistics and Actuarial Science		
Course Aim	With an explosion in information technology in the past decade, vast amounts of data appear in a variety of fields such as finance, customer relations management and medicine. The challenge of understanding these data with		

	the aim of creating new knowledge and finding new relationships among data attributes has led to the innovative usage of statistical methodologies and development of new ones. In this process, a new area called data mining is spawned. This course provides a comprehensive and practical coverage of essential data mining concepts and statistical models for data mining.		
Course Contents	Data pre-processing, association rules, classification and regression trees, neural networks and cluster analysis.		
Learning Outcomes	On successful completion of the course, students should be able to: - implement data mining process summarized in the acronym SEMMA which stands for sampling, exploring, modifying, modeling, and assessing data. - understand and apply a wide range of data mining techniques, and recognize their characteristics, strengths and weaknesses. - be proficient with the leading data mining software---SAS Enterprise Miner. - identify and use appropriate data mining techniques for a data mining project, taking into account both the nature of the data to be mined and the goals of the user of the discovered knowledge. - evaluate the quality of discovered knowledge, taking into account the requirements of the data mining task being solved and the goals of the user.		
Pre-requisites	Pass in STAT1302 or STAT1306 or STAT2802 (Any student who has already passed in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1801 in 2009-10 or before can still apply for the course in 2012-2013.)		
Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 computer lab sessions.		
Assessment Method	100% coursework assessment (30% assignments, 40% tests and 30% group project)		
Course Grade	A+ to F		
Grade Descriptors			

Grade	Descriptor
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.

References	Tan, P. N., Steinback, M. and Kumar, V.: Introduction to Data Mining (Addison Wesley, 2006) T. Hastie, R. Tibshirani, & J. Friedeman: The Elements of Statistical Learning: Data Mining, Inference, and Prediction (Springer, New York, 2008, 2nd edition) M. Kantardzic: Data Mining: Concepts, Models, Methods, and Algorithms (Wiley, 2003) A. Webb: Statistical Pattern Recognition (Wiley, 2002, 2nd edition) Shmueli, G., Patel, N.R. & Bruce, P.C.: Data Mining for Business intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner (Wiley, 2010, 2nd edition) J. Han & M. Kamber: Data Mining: Concepts and Techniques (Morgan Kaufmann, 2006, 2nd edition) Larose, D. T.: Discovering Knowledge in Data: An Introduction to Data Mining (Wiley, 2005)
Course Website	webct.hku.hk
Remarks	Other references: M. J. A. Berry & G. S. Linoff: Data Mining Techniques: For Marketing, Sales and Customer Relationship Management (Wiley, 2011, 3rd edition) Larose, D. T.: Data Mining: Methods and Models (Wiley, 2006)

STAT2313 Marketing engineering (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr C W Kwan, Statistics and Actuarial Science		
Course Aim	This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.		
Course Contents	Marketing decision models, Market response models, Survey research, Statistical methods for segmentation, Statistical methods for positioning, Statistical methods for new product design		
Learning Outcomes	On successful completion of the course, students should be able to: - develop the hands-on skills of curve fitting with Excel Solver and analyzing data with SAS procedures, PROC CLUSTER, PROC FASTCLUS, PROC PRINCOMP, PROC FACTOR, PROC MDS, PROC PRINQUAL, PROC TRANSREG, PROC LOGISTIC, PROC MDC, PROC DISCRIM and PROC CALIS. - understand marketing decision models and least squares method. - understand cluster analysis, principal component analysis, factor analysis, multidimensional scaling, choice models and discriminant analysis, confirmatory factor analysis and structural equation model in market segmentation, positioning and new product design.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801		

Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, a class test and a group project.		
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.		
References	Johnson R, Wichern D: Applied Multivariate Statistical Analysis (Prentice Hall, 5th ed.) Lattin J, Carroll JD and Green PE: Analysing multivatiate data (Thomson) Lilien, G.L. and Rangaswamy, A: Marketing Engineering (Prentice Hall, 2003, 2nd ed.) Hair, Black, Babin, Anderson & Tatham: Multivariate data analysis (Pearson, 2006, 6th ed.)		
Course Website	webct.hku.hk		

STAT2314 Business forecasting (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr R W L Wong, Statistics and Actuarial Science		
Course Aim	In daily business operations, forecasts are routinely required on different aspects of the economy, the market and individual companies. Numerous statistical techniques have been developed in the past decades to provide forecasts for the business decision-maker. This course considers a wide range of such techniques that have proven useful to practitioners. The course will involve the use of computer software, EXCEL, in the teaching process.		
Course Contents	Review of basic statistical concepts; autocorrelation analysis; evaluation and combination of forecasts; moving averages and smoothing methods; simple linear regression; multiple regression; growth curves; time series regression; the handling of seasonal cycles; decomposition methods.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand data patterns and choose a suitable forecasting techniques - Understand forecasting methods: moving averages and smoothing methods, decomposition and winter's methods, simple and multiple linear regression - Develop hands-on skills of analyzing business data with computer software, EXCEL, and its add-ins functions.		
Pre-requisites	Pass in BIOL1608 or BIOL2608 or ECON1003 or STAT0301 or STAT0302 or STAT1306; and Not for students who have passed or already enrolled in any of these courses: STAT1301, STAT1801, STAT2804, STAT3301, ECON0701.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments and a class test		
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.		
Textbooks	J. E. Hanke, D. W. Wichern, & A. G. Reitsch: Business Forecasting (Prentice Hall, 2009, 9th ed.)		

References	P. E. Gaynor & R. C. Kirkpatrick: Introduction to Time-series Modelling and Forecasting in Business and Economics (McGraw-Hill, 1994) P. Newbold & T. Bos: Introductory Business & Economic Forecasting (ITP, 1994)
Course Website	webct.hku.hk
Remarks	Also available to CompSc students having taken STAT1301. Students should obtain approval from the course coordinator before choosing this course.

STAT2315 Practical mathematics for investment (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr T S T Wong, Statistics and Actuarial Science		
Course Aim	The main focus of this course is built on the concepts on financial mathematics. Practical applications of these concepts are also considered.		
Course Contents	This course covers: simple and compound interest; annuities certain; discounted cash flow analysis; amortization schedules and sinking funds; yield rates; bonds and related securities; practical applications such as real estate mortgage, short sales and term structure of interest rates.		
Learning Outcomes	On successful completion of the course, students should be able to: - solve practical problems relating to annuities certain, simple and compound interest. - carry out discounted cash flow analysis. - apply amortization schedules and sinking funds to the practical problems such as real estate mortgage.		
Pre-requisites	Pass in STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801; and Not for students who have passed in STAT1802, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
Textbooks	Kellison, S. G.: The Theory of Interest (Irwin: Illinois, 2008, 3rd edition)		
References	Broverman, S. A.: Mathematics of Investment and Credit (ACTEX Publications - Mad River Books: Connecticut, 2004, 3rd edition)		
Course Website	webct.hku.hk		

STAT2316 Advanced SAS programming (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	96
Course Co-ordinator	TBC, Statistics and Actuarial Science		
Course Aim	This course aims to equip students, who have taken STAT26xx, with a high level of proficiency in SAS programming for automation of procedures and data processing in solving complex problems more efficiently.		
Course Contents	Accessing data using SQL. Macro programming. Advanced programming techniques including data simulation, advanced data look-up techniques, modifying transaction datasets and controlling I/O processing and memory.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply SAS SQL to access data to perform queries - use advanced SAS programming statements and techniques to solve complex problems - use the BY statement for parallel processing to aid automation - use the output dataset without printing to OUTPUT windows for piping idea in automation - use SAS MACRO to develop customized and automated applications.		
Pre-requisites	Pass in STAT1303		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		

Assessment Method	One 2-hour examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, tutorials and class test(s)
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.
Textbooks	On-line documents of the adopted statistical software
References	SAS Certification Prep Guide: Advanced Programming for SAS 9, Third Edition. Schreier, H.: PROC SQL by Example: Using SQL within SAS. (North Carolina: SAS Institute Inc., 2008) Carpenter, A.: Carpenters Complete Guide to the SAS Macro Language. Second Edition. (North Carolina: SAS Institute Inc., 2004)
Course Website	webct.hku.hk

STAT2317 Sample survey methods (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Head of Dept, Statistics and Actuarial Science		
Course Aim	This course will cover design and implementation of sample surveys and analysis of statistical data thus obtained. Survey design includes overall survey design, design of sampling schemes and questionnaires, etc. Sampling methods include sample size determination, sampling and non-sampling errors and biases, methods of estimation of parameters from survey data, imputation for missing data etc.		
Course Contents	Topics may include: survey design and planning; survey quality and ethics; implementation matters like management of survey staff, respondent relationship and logistical issues ; and sampling methods like simple random sampling, systematic sampling, stratified sampling, cluster sampling, multi-stage sampling, sample size determination, post-stratification, ratio and regression estimation methods, non-sampling errors and biases, non-responses and missing data. Case studies of major applications of sample survey methods in the public and private sectors, with some examples on the analysis and application of the statistical data thus produced, will be discussed.		
Learning Outcomes	On successful completion of the course, students should be able to: - demonstrate knowledge and understanding of the various steps to be taken in the planning and implementation of sample surveys - design different sample schemes and select the most efficient and suitable one for adoption for a particular survey - make statistical inference on parameters based on a sample - judge whether the statistics presented by other survey takers are trustworthy		
Pre-requisites	Pass or already enrolled in any of the following courses: BIOL1608 or BIOL2608, ECON1003, STAT0301, STAT0302, STAT1301, STAT1306, STAT1801		
Offer in 2012 - 2013	Not offered	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a test		
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.		
References	S. L. Lohr: Sampling: Design and Analysis, 2nd edition (Duxbury Press, 2010) R. L. Scheaffer, W. Mendenhall, & R. L. Ott: Elementary Survey Sampling (Duxbury Press, 2011, 7th edition)		

	W. G. Cochran: Sampling Techniques (John Wiley & Sons Ltd., 1997) R. M. Groves, F. J. Gowler, M. P. Couper, J. M. Lepkowski, E. Singer & R. Tourangeau: Survey Methodology (John Wiley & Sons Ltd., 2009, 2nd edition) L. Kish: Survey Sampling (John Wiley & Sons, Inc., 1995) P. Salant & D. A. Dillman: How to Conduct Your Own Survey (John Wiley & Sons, Inc., 1994)
Course Website	webct.hku.hk
Remarks	Other references: Census and Statistics Department, Hong Kong SAR: Annual Digest of Statistics (latest release)

STAT2318 Directed studies in statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	30
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		
Course Aim	To enhance students' knowledge of a particular topic and students' self-directed learning and critical thinking skills.		
Course Contents	The student undertakes a self-managed study on a topic in statistics under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance students' understanding of the subject. The project may not require an element of originality.		
Learning Outcomes	On successful completion of the course, students should be able to: - gain first-hand experience in solving a research or applied problem in statistics or related areas; - develop skills in important technical tools, including the use of computer software or programs, for typical statistical research and data analyses; - write succinct reports on the findings of a research study; - make concise oral presentation of the findings of a research study.		
Pre-requisites	Major in Statistics or Risk Management; and Pass in 18 credits from the following courses: STAT0301, STAT0302, STAT1301, STAT1302, STAT1303, STAT1304, STAT1306, STAT1323, STAT1801, STAT1802; and Not for students who have already enrolled in STAT3319 in this academic year; and Not for students admitted in 2006 or before.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	Discussion and meetings to be arranged by the student and the supervisor.		
Assessment Method	Written report (50%), oral presentation and participation (50%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.] B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Course Website	webct.hku.hk		
Remarks	Major in Statistics or Risk Management and at least 18 credits of introductory-level courses in Statistics or Risk Management, and consent of Major Coordinator. (Not available to students admitted in 2006 or before)		

STAT2801 Life contingencies (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E C K Cheung, Statistics and Actuarial Science		
Course Aim	The major objectives of this course are to integrate life contingencies into a full probabilistic framework. The time-until-death random variable is the basic building block by which models for life insurances, designed to reduce the financial impact of the random event of untimely death, are developed. This course introduces the concepts of life contingencies and the basic mathematical skills for modelling life insurance products.		
Course Contents	Key topics include: survival distributions; life table functions; select and ultimate tables; life insurance models; life annuity models; benefit premiums; benefit reserves.		
Learning Outcomes	On successful completion of the course, students should be able to: - calculate the expected values, variances, probabilities, and percentiles for survival-time random variables;		

	- define the continuous survival-time random variable that arises from the discrete survival-time random variable using some assumptions for fractional ages; - define present-value-of-benefit random variables defined on survival-time random variables; - define and calculate the expected values, variances and probabilities for present-value-of-benefit random variables, present-value-of-loss-at-issue random variables, and present-value-of-loss random variables; - calculate benefit premiums for life insurances and annuities; - calculate benefit reserves for life insurances and annuities; - cover part of Exam MLC of the Society of Actuaries.		
Pre-requisites	(Pass in STAT1302 and STAT2315) or (Pass in STAT1802 and (Pass in STAT2802, or already enrolled in this course)) or (Pass in STAT1302 and STAT1802)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and class tests		
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.		
Textbooks	Bowers. N.L., Gerber, H.U., Hickman, J.C., Jones, D.A. & Nesbitt, C.J.: Actuarial Mathematics (1997, 2nd edition), Itasca, Illinois: The Society of Actuaries		
References	Dickson, C.M.D., Hardy, M.R., and Waters, H.R.: Actuarial Mathematics for Life Contingent Risks (Cambridge: Cambridge University Press, 2009)		
Course Website	webct.hku.hk		

STAT2802 Statistical models (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Tian, Statistics and Actuarial Science		
Course Aim	This course is on the basis of 'STAT1801 Probability and Statistics: Foundation of Actuarial Science'. It will further study the concepts and methods of statistics. The course will lay emphasis on the estimation and hypothesis testing, the two major areas of statistical inference. Through the study of this course, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of data.		
Course Contents	Distribution and density of function of random variables; Order statistics, central limit theorem, Maximum likelihood estimator (MLE), moment estimator, Bayesian estimator, properties of estimators, limiting properties of MLE; Confidence interval estimations for normal mean, the difference of two normal means, normal variance, the ratio of two normal variances, and large-sample confidence intervals; Power function, Neyman-Pearson Lemma, likelihood ratio test, and goodness of fit test.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the importance of sufficient statistic(s) in data reduction and statistical inferences such as point estimation, confidence interval estimation, and testing hypothesis; - derive maximum likelihood estimators of parameters to calculate maximum likelihood estimates; - locate pivotal quantity to construct confidence intervals of parameters; - find testing statistic to test hypotheses associated with one-sample and/or two-sample normal distributions with small sample sizes and non-normal distributions with large sample sizes		
Pre-requisites	Pass in STAT1801. (For BSc(Actuarial Science) students only)		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written paper (75% weighting), and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.
References	Miller I. & Miller M.: John E. Freund's Mathematical Statistics with Applications (Pearson Education International, 2004, 7th edition) Hogg R. V., McKean J. W. & Craig A. T.: Introduction to Mathematical Statistics (Pearson Prentice Hall, 2005, 6th edition) Arnold S. F.: Mathematical Statistics (Prentice-Hall, 1990)	
Course Website	webct.hku.hk	
Remarks	Other References: Larsen R. J. and Marx M. L.: An Introduction to Mathematical Statistics and Its Appications (Pearson International Edition, 4th edition)	

STAT2803 Stochastic models (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr J F Yao, Statistics and Actuarial Science		
Course Aim	This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.		
Course Contents	Introduction to probability theory, Conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of interarrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maxium variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).		
Learning Outcomes	On successful completion of the course, students should be able to: - apply the conditioning method to calculate the mean and probability - understand the essentials of Markov chains, the Poisson process, and Brownian motion - understand how stochastic models can be applied to the study of real-life phenomena		
Pre-requisites	For BSc(Actuarial Science) students only; and Pass in STAT1801; and Not for students who have passed in MATH2603, or have already enrolled in this course; and Not for students who have passed in STAT2303, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting), and a coursework assessment (25% weighting) based on assignments and a class test		
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.
Textbooks	S. M. Ross: Introduction to Probability Models (9th edition)	
Course Website	webct.hku.hk	

STAT2804 Linear models and forecasting (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof Y Lam, Statistics and Actuarial Science		
Course Aim	This course deals with applied statistical methods of linear models and investigates various forecasting procedures		

	through using linear models and time series analysis.		
Course Contents	Regression and multiple linear regression; predicting; generalised linear model; time series models including autoregressive, moving average, autoregressive-moving average and integrated models; forecasting.		
Learning Outcomes	On successful completion of the course, students should be able to: - fit a simple or multiple linear regression model to real data; - do ANOVA analysis; - fit a generalized linear model to the real data; - identify and fit a suitable AR, MA or ARMA model to real data; - perform residual analysis; - do forecasting with these fitted models.		
Pre-requisites	(Pass in STAT1302; or Pass in STAT2802, or already enrolled in this course); and For BSc(Actuarial Science) students only; and Not for students who have passed in STAT2301, or have already enrolled in this course; and Not for students who have passed in STAT3301, or have already enrolled in this course; and Not for students who have passed in ECON0701, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting), and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.	
References	R. S. Pindyck & D. L. Rubinfeld: Econometric Models and Economic Forecasts (McGraw-Hill, 1998, 4th edition) Abraham & J. Ledolter: Statistical Methods for Forecasting (John Wiley & Sons, 2005, 2nd edition) G. E. P. Box, G. M. Jenkins & G. Reinsel: Time Series Analysis: Forecasting and Control (Prentice Hall, 1994, 3rd edition)		
Course Website	webct.hku.hk		

STAT2805 Credibility theory and loss distributions (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K C Cheung, Statistics and Actuarial Science		
Course Aim	Credibility is an example of a statistical estimate. The idea of credibility is very useful in premium calculation. Insurance loss varies according to the business nature, what distribution should be used to fit a particular loss is both of theoretical interest and practical importance. This course covers important actuarial and statistical methods.		
Course Contents	Limited fluctuation approach; Buhlman's approach; Bayesian approach; empirical Bayes parameter estimations; construction and selection of parametric models; properties and estimation of failure time and loss distributions, determination of the acceptability of a fitted model; comparison of fitted models; simulation of both discrete and continuous random variables.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply limited fluctuation (classical) credibility including criteria for both full and partial credibility; - perform Bayesian analysis using both discrete and continuous models; - apply Buhlmann and Buhlmann-Straub models and understand the relationship of these to the Bayesian model; - apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model; - apply empirical Bayesian methods in the nonparametric and semiparametric cases; - construct and select empirical models; - determine the acceptability of a fitted model and/or compare models.		
Pre-requisites	Pass in STAT1302 or STAT2802 or STAT3810		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.
References	Klugman S. A., Panjer H. H., & Willmot G. E.: Loss Models: From Data to Decisions (John Wiley & Sons, 2008, 3rd edition), Chapters 12-16, 20-21.	
Course Website	webct.hku.hk	

STAT2807 Corporate finance for actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr J K Woo, Statistics and Actuarial Science		
Course Aim	This course is designed for actuarial science students to receive VEE-Corporate Finance from Society of Actuaries. The objective of this course is to introduce students to the fundamental principles of corporate finance. The course will provide students with a systematic framework within which to evaluate investment and financing decisions for corporations.		
Course Contents	The first part of the course will give an introduction to corporate finance and provide an overview of some topics covered in STAT1802 and STAT2315. These include: financial markets and companies; present value and net present value, financial instruments and dividends derivatives market, no-arbitrage pricing theory, binomial model and Black-Scholes option pricing formula. The main part of the course will focus on some important topics of corporate finance including: capital structure and dividend policy, financial leverage and firm value, market efficiency, risk and return, investment decision using Markowitz mean variance analysis, CAPM, long term financing, measures and performance assessment of financial performance using various measures.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the factors to be considered by a company when deciding on its capital structure and dividend policy, and also the impact of financial leverage and long/short term financing policies on capital structure; - calculate the value of bonds and stocks; - assess financial performance using various measures; - understand the mean-variance portfolio theory.		
Pre-requisites	Pass in BUSI1002 and STAT1802; or Pass in STAT2310 and STAT2315.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
Textbooks	Brealey R. A., Myers S. C. and Allen, F.: Principles of Corporate Finance (2006, 8th edition)		
References	Ross, S. A., Westerfield, R. W. and Jaffe, J.: Corporate Finance (2005, 7th edition) Luenberger, D. G.: Investment Science (1998)		
Course Website	webct.hku.hk		

STAT2812 Financial economics I (6 credits)		**Academic Year**	**2012**

Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof H L Yang, Statistics and Actuarial Science		
Course Aim	This course is a basic course on the derivative market. The course covers discrete-time models, volatility estimation, and Black-Scholes formula and its variations. The course also includes some basic risk management ideas and methods. This course and STAT3812 will cover all the concepts, principles and techniques needed for SoA Exam MFE.		
Course Contents	Option on currencies; European and American options; conditional expectation and discrete-time martingale, discrete-time option-pricing theory; binomial model and its Greeks; true probabilities vs. risk-neutral probabilities; estimating volatility; the Black-Scholes formula; implied volatility; Greeks again; market-making and hedging; exotic options.		
Learning Outcomes	On successful completion of the course, students should be able to: - Calculate option price using binomial tree - Understand the risk neutral probability - Understand basic probability theory, include probability space, random variable, conditional probability, conditional expectation and discrete time martingale - Understand the Black-Scholes formula and its assumptions, the Greek letters, option elasticity, and implied volatility - Understand the hedging strategies and portfolio, market-maker risk, self-financing portfolio - Understand exotic options		
Pre-requisites	Pass in STAT1302 or STAT2802; and Not for students who have passed in STAT3303, or have already enrolled in this course; and Not for students who have passed in FINA0301, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
Textbooks	Robert L. McDonald: Derivatives Markets (2nd edition), Chapters 10-14 Lecture notes on conditional expectations and martingale		
References	John Hull: Options, Futures and other Derivatives (2008, 7th edition)		
Course Website	webct.hku.hk		

STAT2813 Internship in actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr L F K Ng, Statistics and Actuarial Science		
Course Aim	This course is offered to actuarial science students who take on an 6-month full time or similar internships. The objective is for a student to complete this course as a project based on his/her internship.		
Course Contents	This course will include a written report which should emphasize important working/ educational experiences encountered by the student during his/her internship. In many situations, this would mean a report of the project(s) that the student has been involved in during his/her internship.		
Learning Outcomes	On successful completion of the course, students should be able to: - Gain practical experiences during internship. - Describe basic actuarial practices learned during the internship. - Explain how actuarial theories learned in University can be applied in practice. - Provide context for specific technical skills developed in basic actuarial courses.		
Pre-requisites	Pass in STAT1802 or STAT2801; and For BSc(Actuarial Science) students only		
Offer in 2012 - 2013	1st sem 2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No regular lectures		
Assessment Method	50% written report, 50% oral presentation and participation		
Course Grade	A+ to F		

Grade Descriptors	A	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]
	B	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Course Website	webct.hku.hk	

STAT2820 Introduction to financial derivatives (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E C K Cheung, Statistics and Actuarial Science		
Course Aim	This course aims at providing an understanding of the fundamental concepts of financial derivatives. Emphases are on basic trading and hedging strategies, and the concept of no-arbitrage.		
Course Contents	Derivatives; short-selling; forward contracts; call options; put options; equity-linked CD; spreads and collars; hedging; financial forwards and futures; commodity swaps; interest rate swaps; put-call parity.		
Learning Outcomes	On successful completion of the course, students should be able to: - define and recognize the definitions of terms commonly used in derivatives markets; - evaluate the payoff and profit of basic derivative contracts, including forwards, futures, options, and swaps; - explain how derivative securities can be used as tools to manage financial risk.		
Pre-requisites	Pass in STAT1802; and For BSc(Actuarial Science) students only; and Not for students who have passed in STAT3303, or have already enrolled in this course; and Not for students who have already passed in STAT3308 before; and Not for students who have passed in FINA0301, or have already enrolled in this course.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.
Textbooks	McDonald, R. L.: Derivatives Markets (Addison Wesley, 2006, 2nd edition), Chapters 1-5, 8.	
Course Website	webct.hku.hk	

STAT3301 Time-series analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Li, Statistics and Actuarial Science		
Course Aim	A time series consists of a set of observations on a random variable taken over time. Time series arise naturally in climatology, economics, environment studies, finance and many other disciplines. The observations in a time series are usually correlated; the course establishes a framework to discuss this. This course distinguishes different type of time series, investigates various representations for the processes and studies the relative merits		

	of different forecasting procedures. Students will analyse real time-series data on the computer.
Course Contents	Stationarity and the autocorrelation functions; linear stationary models; linear non-stationary modes; model identification; estimation and diagnostic checking; seasonal models and forecasting methods for time series.
Learning Outcomes	On successful completion of the course, students should be able to: - recognize a stationary vs non-stationary time series; - understand some basic properties of commonly used time series models such as AR (autoregressive), MA (moving average) and ARMA models; - transform non-stationary time series into stationary ones; - identify different time series models based on autocorrelation functions; - fit a suitable AR, MA or ARMA model to real data using SAS (after transforming to stationarity if necessary); - perform goodness of fit tests for such models; - do forecasting with these fitted time series models.
Pre-requisites	Pass in STAT2301; and Not for students who have passed in STAT2314, or have already enrolled in this course; and Not for students who have passed in STAT2804, or have already enrolled in this course.
Offer in 2012 - 2013	1st sem **Examination** Dec
Offer in 2013 - 2014	Y
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 2-hour written examination (60% weighting) and a coursework assessment (40% weighting) based on a project, a test, and assignments
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.
Textbooks	J. D. Cryer & K.S. Chan: Time Series Analysis with Applications in R (Springer, 2008, 2nd edition)
References	Bovas Abraham & Johannes Ledolter: Statistical Methods for Forecasting (John Wiley & Sons, 2005, 2nd edition) W. W .S. Wei: Time Series Analysis: Univariate and Multivariate Methods (Addison-Wesley, 2006, 2nd edition) W. K. Li: Diagnostic Checks in Time Series (Chapman & Hall/CRC, 2004) Howell Tong: Non-linear Time Series: A Dynamical System Approach (Oxford University Press, 1990)
Course Website	webct.hku.hk

STAT3302 Multivariate data analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	60
Course Co-ordinator	Prof T W K Fung, Statistics and Actuarial Science		
Course Aim	In many designed experiments or observational studies, the researchers are dealing with multivariate data, where each observation is a set of measurements taken on the same individual. These measurements are often correlated. The correlation prevents the use of univariate statistics to draw inferences. This course develops the statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.		
Course Contents	Problems with multivariate data. Multivariate normality and transforms. Mean structure for one sample. Tests of covariance matrix. Correlations: Simple, partial, multiple and canonical. Multivariate regression. Principal components analysis. Factor analysis. Problems for means of several samples. Multivariate analysis of variance. Discriminant analysis. Classification. Multivariate linear model.		
Learning Outcomes	On successful completion of the course, students should be able to: - analyze multivariate data with main SAS procedures, such as PROC IML, PROC REG, PROC CORR, PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCRIM, PROC CANDISC and etc. - compare the mean structure of multiple measurements for one or more than one population(s) by multivariate MANOVA and profile analysis - investigate the linear associations among one/two group(s) of variables by multiple, partial and canonical correlation and multivariate regression - explore the latent linear structure of a data set with multiple measurements by principal components analysis and factor analysis - classify observations of a population with one or more than one measurements by discriminant analysis		
Pre-requisites	Pass in STAT2301 or STAT2804		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		

Assessment Method	One 3-hour written examination (50% weighting) and a course assessment (50% weighting) based on assignments, tutorials and a class test
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.
Textbooks	Johnson, R. A. & Wichern, D. W.: Applied Multivariate Statistical Analysis (Prentice-Hall, 2007, 6th edition)
References	Mardia K. V., Kent J. T., and Bibby J. M.: Multivariate Analysis (Academic Press, 1979) Seber G. A. F.: Multivariate Observations (John Wiley & Sons, 1984) Morrison D. F.: Multivariate Statistical Methods (McGraw-Hill, 1990, 3rd ed.) Hair J. F., Anderson R. E., Tatham R. L., & Black W. C.: Multivariate Data Analysis (Prentice-Hall, 2006, 6th edition) Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002) SAS Manuals on-line: Use the HELP button.
Course Website	webct.hku.hk

STAT3303 Derivatives and risk management (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr R W L Wong, Statistics and Actuarial Science		
Course Aim	Nowadays all risk managers must be well versed in the use and valuation of derivatives. The two basic types of derivatives are forwards (having a linear payoff) and options (having a non-linear payoff). All other derivatives can be decomposed to these underlying payoffs or alternatively they are variations on these basic ideas. This course aims at demonstrating the practical use of financial derivative in risk management. Emphases are on pricing and hedging strategies, and the concept of no-arbitrage.		
Course Contents	Review of futures, forwards and options and the concept of no arbitrage; hedging strategies using futures; pricing of forward and futures; interest rate futures and swaps; trading strategies using options; put-call parity; valuation of European and American options using the binomial-tree model; valuation of European and American options using the Black-Scholes option pricing model; the Greeks: their calculation and interpretation; implied volatility; delta hedging and the role of market-makers; exotic options: Asian options, barrier options, compound options, gap options and exchange options.		
Learning Outcomes	On successful completion of the course, students should be able to: - use future, forwards, options and swaps to formulate financial strategies; - determine the payoff and the value of various derivative products using binomial tree and Black-Sholes formula; - explain how derivative products can be used as tools to manage financial risk. - recognize how to decompose complicated derivatives into a profolio of standard derivations.		
Pre-requisites	Pass in STAT2315; and Not for BSc(Actuarial Science) students; and Not for students who have passed in STAT2812, or have already enrolled in this course; and Not for students who have passed in STAT2820, or have already enrolled in this course; and Not for students who have passed in FINA0301, or have already enrolled in this course; and Not for students who have already passed in STAT3308 before.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.
Textbooks	Hull, J. C.: Options, Futures, and Other Derivatives (Prentice Hall, 2009, 7th edition), Chapters 3, 5-7, 9-11, 13, 17-18, 24.	
References	McDonald, R. L.: Derivatives Markets (Addison Wesley, 2006, 2nd edition), Chapters 1-2, 4-5, 7-14, 23. Hull, J.C.: Risk Management and Financial Institutions (Pearson Higher Education, 2010, 2nd edition)	
Course Website	webct.hku.hk	

STAT3304 Computer-aided statistical modelling (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	60
Course Co-ordinator	Dr G Tian, Statistics and Actuarial Science		
Course Aim	This is a computer-aided course of statistical modelling designed for students who have taken STAT2301 Linear Statistical Analysis and like to see theory illustrated by practical computation. Real data sets will be presented for modelling and analysis using statistical software SAS for gaining hands-on experience. The course aims to develop skills of model selection and hypotheses formulation so that questions of interest can be properly formulated and answered. An important element deals with model review and improvement, when one's first attempt does not adequately fit the data.		
Course Contents	Descriptive statistics and presentation of data for nominal and continuous data; Simple statistical analyses for the one-sample and two-sample case using parametric and nonparametric methods; Regression analyses: Model Fitting; Regression analyses: Variable Selection and Model Diagnostic Checking; Analysis of Variance (ANOVA): 1-way, Two-Way and Higher-Way ANOVA; Covariance analysis; Logistic Regression.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply SAS SQL to access data to perform queries - use advanced SAS programming statements and techniques to solve complex problems - use the BY statement for parallel processing to aid automation - use the output dataset without printing to OUTPUT windows for piping idea in automation - use SAS MACRO to develop customized and automated applications.		
Pre-requisites	Pass in STAT2301 or STAT2804; and Not for students who have passed in STAT2311, or have already enrolled in this course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, tutorials, and class test(s)		
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.	
Textbooks	On-line documents of the adopted statistical software		
References	Bowerman, B.L. & O'Connell, R.T. (1990). Linear Statistical Models: An Applied Approach, 2nd edition, PWS-Kent Publishing Company. Cody, R.P. & Smith, J.K. (1997). Applied Statistics and the SAS Programming Language, 4th edition, North-Holland. Dilorio, F.C. & Hardy, K.A. (1996). Quick Start to Data Analysis with SAS, Duxbury Press. Elliott, R.J. (2000). Learning SAS in the Computer Lab, 2nd edition, Duxbury Press. Myers, R.H. (1990). Classical and Modern Regression with Applications, 2nd edition, PWS-Kent Publishing Company.		
Course Website	webct.hku.hk		

STAT3306 Selected topics in statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		

Course Aim	This course introduces some statistical concepts and methods which potential graduate students will find useful in preparing for work on a research degree in statistics. Focus is on applications of state-of-the-art statistical techniques and their underlying theory.		
Course Contents	The contents will be chosen from the following topics: 1. Basic asymptotic methods: modes of convergence; stochastic orders; laws of large numbers; central limit theorems; delta method; Edgeworth expansions; saddlepoint approximations. 2. Parametric and nonparametric likelihood methods: high-order approximations; profile likelihood and its variants; signed likelihood ratio statistics; empirical likelihood. 3. Nonparametric statistical inference: sign and rank tests; Kolmogorov-Smirnov test; nonparametric regression; density estimation; kernel methods. 4. Robust methods: measures of robustness; M-estimator; L-estimator; R-estimator; estimating functions. 5. Computationally-intensive methods: cross-validation; bootstrap; permutation methods. 6. Sequential analysis: sequential probability ratio test; sequential estimation. 7. Model selection using information criteria. 8. Other topics as determined by the instructor.		
Learning Outcomes	On successful completion of the course, students should be able to: - comprehend the language and technicalities found in statistical research literature; - understand the use of standard mathematical tools for conducting statistical research; - apply a variety of research tools to solve standard statistical problems; acquire exposure to some developments in contemporary statistical research.		
Pre-requisites	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT6009.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test		
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, 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.		
References	DasGupta, A. (2008). Asymptotic Theory of Statistics and Probability. Springer:. Efron, B. and Tibshirani, R.J. (1993). An Introduction to the Bootstrap. Chapman & Hall: New York. Owen, A.B. (2001). Empirical Likelihood. Chapman & Hall: Boca Raton. Shao, J. (1999). Mathematical Statistics. Springer: New York. Wasserman, L. (2006). All of Nonparametric Statistics. Springer.		
Course Website	webct.hku.hk		

STAT3316 Advanced probability (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof Y Lam, Statistics and Actuarial Science		
Course Aim	This course provides an introduction to measure theory and probability. The course will focus on some basic concepts in theoretical probability which are important for students to do research in actuarial science, probability and statistics.		
Course Contents	sigma-algebra, measurable space, measure and probability, measure space and probability space, measurable functions, random variables, integration theory, characteristic functions, convergence of random variables, Hilbert spaces, conditional expectation, martingales.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand the fundamental measure theory and probability theory. - Learn the general concept of integration, understand the monotone convergence theorem, Fatou's lemma and dominated convergence theorem. - Understand the concept of conditional expectation. - Have some elementary knowledge of martingale.		
Pre-requisites	Pass in STAT2303 or STAT2803. This course is mutually exclusive to STAT6010.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, tutorials and a class test, etc.		

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.
References	Jean Jacod and Philip Protter: Probability Essentials (Universitext, Springer-Verlag, New York, 2004, 2nd edition) Chow Y. H. and Teicher H.: Probability Theory (Springer-Verlag, New York, 1997, 3rd edition) Chung K. L.: A Course in Probability Theory (Academic Press, 2001, 3rd edition)
Course Website	webct.hku.hk

STAT3317 Computational statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Tian, Statistics and Actuarial Science		
Course Aim	This course aims to give undergraduate and postgraduate students in statistics a background in modern computationally-intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods.		
Course Contents	Generation of random variables including the inversion method, the grid method, the sampling/importance resampling method, the stochastic representation method, and the conditional sampling method; Optimization techniques including Newton's method, expectation-maximization (EM) algorithm and its variants, and minorization-maximization (MM) algorithms; Integration including Laplace approximations, Riemannian simulation, the importance sampling method and variance reduction techniques; Markov chain Monte Carlo methods including data augmentation algorithm, Gibbs sampler, and the exact inverse Bayes formulae sampling; Bootstrap methods.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the importance of the technique for generating random variables in Bayesian statistics, Monte Carlo integration and bootstrapping methods; - realize the advantages and disadvantages of the Newton-Raphson algorithm and the Fisher scoring algorithm and apply them to fit generalized linear models; - understand the essence and basic principle of the EM-type algorithms and MM-type algorithms, realize their range of application, and apply them to solve practical problems; - apply EM-type algorithms to find the posterior mode and apply Markov chain Monte Carlo methods to generate posterior samples; - apply Bootstrap methods to obtain estimated standard errors of estimators and confidence intervals of parameters for both parametric and non-parametric cases.		
Pre-requisites	Pass in STAT2301. This course is mutually exclusive to STAT6011.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, practical work and a term test.		
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.		
Textbooks	Tan, M., Tian, G.L. and Ng, K.W: Bayesian Missing Data Problems: EM, Data Augmentation and Non-iterative Computation (Chapman & Hall/CRC, Boca Raton, 2010).		
References	Givens, G.H. and Hoeting, J.A.: Computational Statistics (Wiley, 2005) Robert, C.P. and Casella, G.: Monte Carlo Statistical Methods (Springer, 2005, 2nd edition)		
Course Website	webct.hku.hk		

STAT3319 Statistics project (12 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	15
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		
Course Aim	Each year a few projects suitable for Statistics or Risk Management major students will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation.		
Course Contents	These projects, under the supervision of individual staff members, involve the applications of statistics and/or probability in a wide range of problems of practical and/or academic interests.		
Learning Outcomes	On successful completion of the course, students should be able to: - gain first-hand experience in solving a research or applied problem in statistics or related areas; - develop skills in important technical tools, including the use of computer software or programs, for typical statistical research and data analyses; - write succinct reports on the findings of a research study; - make concise oral presentation of the findings of a research study.		
Pre-requisites	Pass in STAT2301; and Not for students who have already enrolled in STAT2318 in this academic year		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	The student is expected to meet and discuss with a supervisor regularly in the course of the project.		
Assessment Method	Written report (50%), oral presentation and participation (50%)		
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.] B: Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills. Fail: Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.		
Course Website	webct.hku.hk		
Remarks	Approval is subject to past academic performance. This course is offered solely to students majoring in statistics or risk management admitted in 07-08 or thereafter.		

STAT3320 Risk management and Basel Accords in banking and finance (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Mr P K Y Pang, Statistics and Actuarial Science		
Course Aim	To provide comprehensive knowledge and in-depth understanding of risk management in the banking and finance industry to students. The focus is on management with basic measurement fundamentals only forming a part of the course. Accordingly, minimal background in quantitative methods will be required and involved. However, basic financial product (eg: bonds, swaps, options) knowledge will be required.		
Course Contents	The course introduces and explains: - the importance of risk management, - risk nature and types, - design and establishment of a risk management framework, - the importance of people and corporate culture, - the complete risk management cycle, - measurement and management of credit, market and operational risks, - Basel accords and the capital treatments for credit, market and operational risks, - key developments (eg: Know-Your-Customers, Anti-Money laundering, Sarbanes-Oxley) and critical issues, - the importance of business continuity, - design and implementation of a business continuity plan.		
Learning Outcomes	On successful completion of the course, students should be able to (in the context of banking and finance industry): - understand the importance, nature and classification of various risks, and the risk management principle and cycle, - design and establish a risk management framework, - demonstrate knowledge and understanding of the measurements of credit, market and operational risks, - explain and describe Basel accords and its capital treatments for credit, market and operational risks,		

	- appreciate the importance of, design and implement a business continuity plan.		
Pre-requisites	Pass in STAT2812 or STAT2820 or STAT2808 or STAT3303 or STAT3308 or FINA0301; and Not for students who have already passed in STAT2320 before.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments, tutorials and a class test		
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.	
Textbooks	TBC		
References	Crouhy, M., Galai, D. and Mark, R.: The Essentials of Risk Management (McGraw-Hill, 2006) Jorion, P.: Financial Risk Manager Handbook + Test Bank: FRM part I/Part II (Wiley, 2010, 6th edition) Hull, J. C.: Risk Management and Financial Institutions (Pearson Higher Education, 2010, 2nd edition) Gallati, R.: Risk Management and Capital Adequacy (McGrawHill, 2003)		
Course Website	webct.hku.hk		
Remarks	This course is previously called STAT2320 as the prerequisite changed to STAT3303.		

STAT3321 Credit risk analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Mr K P Wat, Statistics and Actuarial Science		
Course Aim	For a commercial bank, credit risk has always been the most significant. It is the risk of default on debt, swap, or other counterparty instruments. Credit risk may also result from a change in the value of an asset resulting from a change in the counterparty's creditworthiness. This course will introduce students to quantitative models for measuring and managing credit risk. It also aims to provide students with an understanding of the credit risk methodology used in the financial industry and the regulatory framework in which the credit risk models operate.		
Course Contents	Probabilities of default, recovery rates and loss given default; Default and credit migration; credit scoring and internal rating models; Credit portfolio models such as CreditMetrics, CreditPortfolioView, KMV and actuarial approach; Credit derivatives.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the Basel requirements for credit risk; - estimate credit scores using the logit model; - understand and estimate default probabilities using various approaches such as Moody's, the KMV and the mortality method; - understand the concept of credit value-at-risk and the CreditMetrics approach; - estimate default correlations; - assess rating systems.		
Pre-requisites	Pass in STAT2812 or STAT3303 or STAT3308 or STAT2808 or STAT2820 or FINA0301, or already enrolled in one of these courses.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments, tutorials and class test(s).		
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.
References	M. Crouhy, D. Galai & R. Mark: Risk Management (McGraw-Hill, 2001) A. Resti & A. Sironi: Risk Management and Shareholders' Value in Banking: From Risk Measurement Models to Capital Allocation Policies (Wiley, 2007) A. Saunders & L. Allen: Credit Risk Measurement In and Out of the Financial Crisis: New Approaches to Value at Risk and Other Paradigms (Wiley, 2010, 3rd Edition) G. Loffler & P. N. Posch: Credit Risk Modeling using Excel and VBA (Wiley, 2010, 2nd edition) J. R. Bohn & R. M. Stein: Active Credit Portfolio Management in Practice (Wiley, 2009) C. W. Smithson: Credit Portfolio Management (Wiley, 2003) D. N. Gujarati & D. C. Porter: Basic Econometrics (McGraw-Hill, 2009, 5th edition) J. C. Hull: Risk Management and Financial Institutions (Prentice Hall, 2010, 2nd edition)	
Course Website	webct.hku.hk	
Remarks	References - Cont'd J. C. Hull: Options, Futures, and Other Derivatives (Prentice Hall, 2012, 8th edition)	

STAT3322 Market risk analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr Z Zhang, Statistics and Actuarial Science		
Course Aim	Financial risk management has experienced a revolution in the last decade thanks to the introduction of new methods for measuring risk, particularly Value-at-Risk (VaR). This course introduces modern risk management techniques covering the measurement of market risk using VaR models and financial time series models, and stress testing.		
Course Contents	Risk Measures; Value-Vat-Risk (VaR) models (parametric, Monte Carlo simulation and Historical simulation); Risk factor mapping; Advanced VaR models (GARCH-type models, extreme-value theory and normal-mixture); Principal Component Analysis and VaR; Backtesting and stress testing.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand VaR and expected shortfall as risk measures, - Compute VaR and expected shortfall, - Model volatility using GARCH-type models, - Understand extreme-value theory, and - Understand backtesting and stress testing.		
Pre-requisites	Pass in ECON1001 or FINA2802 or STAT2309; or Pass in STAT2812 or STAT2806, or already enrolled in either course.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour examination (60% weighting) and a coursework assessment (40% weighting) based on assignments, tutorials and a class test		
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.		
References	Jorion, P.: Value-at-Risk: The New Benchmark for Managing Financial Risk (McGraw-Hill, 2007, 3rd edition) Alexander, C.: Market Models: A Guide to Financial Data Analysis (Wiley, 2001) Alexander, C.: Market Risk Analysis: Practical Financial Econometrics (Wiley, 2008) Alexander, C.: Market Risk Analysis: Value-at-Risk Models (Wiley, 2009) Tsay, R. S.: Analysis of Financial Time Series (Wiley, 2005, 2nd edition)		
Course Website	webct.hku.hk		

STAT3323 Current topics in risk management (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---

Course Co-ordinator	Head of Dept, Statistics and Actuarial Science		
Course Aim	This course is to broaden the students knowledge of risk management by considering current topics in risk management. These topics will build on the theory and methods covered in the core courses. The topics offered each year depend on staff availability.		
Course Contents	Liquidity risk; BASEL III and beyond; Operational risk; Model risk; Cutting edge risk analytics and innovations in risk management.		
Learning Outcomes	On successful completion of the course, students should be able to: - gain insights into current advances in risk management - understand current risk management pitfalls and development - make effective use of models and techniques for managing various kinds of risk		
Pre-requisites	Pass in STAT3301		
Offer in 2012 - 2013	Not offered	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour examination (40% weighting) and a coursework assessment (60% weighting) based on assignments, tutorials and class test(s)		
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.

References	Dowd, K: Measuring Market Risk. 2nd Edition (Wiley, 2005). (Chapters 14, 16) Fiedler, R.: Liquidity Modelling. (Risk Books, 2011) Franzetti, C.: Operational Risk Modeling and Management. (Chapman & Hall/CRC Finance Series, 2010) Basel Committee on Banking Supervision:Basel III: International Framework for liquidity risk measurement, standards and monitoring (BIS, 2010) Basel Committee on Banking Supervision:Basel III: A global regulatory framework for more resilient banks and banking systems (BIS, 2010)
Course Website	webct.hku.hk

STAT3801 Advanced life contingencies (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr L F K Ng, Statistics and Actuarial Science		
Course Aim	The objective of the course is to prepare students for the Non-traditional and Universal Life Insurance parts of the Models for Life Contingencies (MLC) course of the Society of Actuaries. Emphasis will be placed on applications of more advanced theories of life contingencies.		
Course Contents	This course is a continuation of the materials covered in STAT2801. We shall discuss the following topics: Loss-at-issue random variable, Benefit premium, Future loss random variable, Benefit reserves, Cash flow projection, Present value of cash flows, Expenses and asset shares.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand how concepts presented for traditional life insurances and annuities extend to non-interest sensitive insurances other than traditional insurances; - understand the models used to model cash flows for basic universal life insurances and calculate contract level values; - understand the models used to model cash flows of basic universal life insurance and calculate the present values of the cash flows; - understand the benefit reserve for and calculate benefit reserve for basic universal life insurances; - understand the relationship between expenses and gross premium and calculate contract level values based on the gross premium for life insurances and annuities.		
Pre-requisites	Pass in STAT2801, or already enrolled in this course; and For BSc(Actuarial Science) students only.		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting), and a coursework assessment (25% weighting) based on assignments and a class test		
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.
References	Bowers, N. L. et al.: Actuarial Mathematics (Society of Actuaries, 1997, 2nd ed) Dickson, C.M.D., Hardy, M.R. and Waters, H.R.: Actuarial Mathematics for Life Contingent Risks (Cambridge University Press, 2009)
Course Website	webct.hku.hk

STAT3802 Advanced contingencies (6 credits)		**Academic Year**	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof H L Yang, Statistics and Actuarial Science		
Course Aim	This course serves as a continuation of STAT3801 and extends the coverage to include statistical models and actuarial techniques used in the field of life and non-life insurance. [Students are reminded that this course is a part of the requirement for the exemption from the Subject CT5 Contingencies of the Faculty and Institute of Actuaries, U.K.]		
Course Contents	Topic covers further analysis of the multiple decrement model; multiple state model; disability contracts; long-term care contracts; unit-linked contracts; with profit policies; emerging costs methods; profit testing; asset shares; valuation for pension plans; cost of guarantees and options; applications of actuarial techniques to a wide range of insurance problems. Equity linked insurance products and valuation of these procducts.		
Learning Outcomes	On successful completion of the course, students should be able to: - Value the cashflow contingent upon more than one risk - Calculate expected cashflows for whole life, endowment, term assurances, annuities, and unit-linked contracts - Understand simple annual premium contracts profit test and how the profit test may be used to price a product, or to determine reserves - Understand how to use multiple decrement tables to evaluate expected cashflows dependent upon more than one decrement, including: pension benefits, salary related benefits, health and care insurance - Understand the equity linked insurance products, and the method and idea of valuing the equity linked insurance products.		
Pre-requisites	Pass in STAT3801; and For BSc(Actuarial Science) students only.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting), and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
References	Neill, A.: Life Contingencies (Heinemann, 1977) Bowers, N. L. et al.: Actuarial Mathematics (Society of Actuaries, 1997, 2nd ed.) Scott, W. F.: Life Assurance Mathematics (Heriott-Watt University, 1999) Berin, B. N.: The Fundamentals of Pension Mathematics (Society of Actuaries, 1989) CT5 Contingencies Core Technical Core Reading (Institute of Actuaries, 2010) Lecture note on equity linked insurance products.		
Course Website	webct.hku.hk		

STAT3806 Investment and asset management (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Head of Dept, Statistics and Actuarial Science		
Course Aim	The main objective of this course is to introduce students to some of the methods and procedures commonly used in the management of an investment portfolio. Emphasis will be placed on methods to tackle problems faced by insurance industry such as investment strategy formulation and interest rate risk management.		
Course Contents	This course provides an overview on the problems faced by actuaries when applying fundamental actuarial concepts to investment practice. This course will cover the following topics: Investment Management Process, Asset Allocation, Managing Fixed Income Portfolios and Performance Measurement.		
Learning Outcomes	On successful completion of the course, students should be able to: - Explain how an investment policy and an investment strategy can help manage risk. - Identify the obligations of a fiduciary in managing investment portfolios. - Describe how to select an investment strategy for an individual. - Describe the particular issues influencing investment strategies for institutional investors. - Explain principles of risk-based capital management. - Describe asset allocation strategies that can be used to construct an asset portfolio. - Identify and describe financial and non-financial risks faced by an entity. - Define risk metrics to quantify major types of risk exposure. - Apply ALM principles to the establishment of investment policy and strategy. - Select or build a benchmark for a given portfolio or portfolio management style. - Describe and assess performance measurement methodologies for investment portfolios.		
Pre-requisites	Pass in STAT2801; and For BSc(Actuarial Science) students only; and Not for students who have passed in FINA2802, or have already enrolled in this course.		
Offer in 2012 - 2013	Not offered	**Examination**	To be confirmed
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (50% weighting), and a coursework assessment (50% weighting) based on tutorials/example classes, group discussions, project and presentation		
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.		
References	D. Babbel & F. J. Fabozzi: Investment Management for Insurers (Frank J. Fabozzi & Assoc., 1999) Z. Bodie, A. Kane, & A. Marcus: Investments (McGraw-Hill, 2005, 7th edition) Crouhy, Galai, & Mark: Risk Management (2001) F. J. Fabozzi: Handbook of Fixed Income Securities (McGraw-Hill, 2005, 7th edition) Litterman: Modern Investment Management: An Equilibrium Approach (2003)		
Course Website	webct.hku.hk		
Remarks	Other references: J. L. Maginn, D.L. Tuttle, J.E. Pinto & D.W. McLeavey: Managing Investment Portfolios, A Dynamic Process (Wiley, 2007, 3rd edition) Tilman: Asset / Liability Management of Financial Institutions (2003)		

STAT3807 Fundamentals of actuarial practice (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr L F K Ng, Statistics and Actuarial Science		
Course Aim	This course teaches students about the business environment and exposes them to practical real-world situations using the actuarial control cycle as a framework.		
Course Contents	This course provides an overview on selected materials relating to the following topics: Role of the Professional Actuary, External Forces, Risk in Actuarial Problems, Design and Pricing of Actuarial Solutions. Emphasis will placed on applications to various financial security programmes including individual life insurance, group insurance, social security plans, retirement plans, investment funds and property & casualty insurance.		
Learning Outcomes	On successful completion of the course, students should be able to: - Provide introductory description of financial security systems, common actuarial techniques and practical experiences. - Describe actuarial practices, principles, approaches, methods, commonalities, problems and solutions.		

	- Explain actuarial practices across the traditional areas of practice. - Explain actuarial practices as applied directly on behalf of financial security system providers or as a consultant to those providers. - Apply actuarial skills in nontraditional and emerging areas of practice. - Provide context for the specific mathematical and technical skills developed in the basic actuarial courses. - Prepare for the professional role as an Associate of the Society of Actuaries.
Pre-requisites	Pass in STAT3801; and For BSc(Actuarial Science) students only.
Offer in 2012 - 2013	1st sem — **Examination**: No Exam
Offer in 2013 - 2014	Y
Teaching Hours	The course consists of 36 lectures.
Assessment Method	100% coursework assessment (25% in-class quizzes or group discussions, 25% oral presentation and 50% written report)
Course Grade	A+ to F
Grade Descriptors	

Grade	Descriptor
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.

References	Bellis, C., Shepherd, J., and Lyon, R.: Understanding Actuarial Management: The Actuarial Control Cycle (Institute of Actuaries of Australia, 2003) Bluhm, W. F.: Group Insurance (ACTEX Publications, 2007, 5th ed.) Brown, R. L. and Gottleib, L. R.: Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance (ACTEX Publications, 2007, 3rd ed.)
Course Website	webct.hku.hk
Remarks	Other references: Easton, A. E. and Harris, T. F.: Actuarial Aspects of Individual Life Insurance and Annuity Contracts (ACTEX Publications, inc., 2007, 2nd ed.) Lam, J.: Enterprise Risk Management: From Incentives to Controls (John Wiley & Sons, 2003) Luenberger, D. G.: Investment Science (Oxford University Press, 1998) McGill, D. M., Brown, K. N., Haley, J. J., and Schieber, S. J.: Fundamentals of Private Pensions (Oxford University Press, 2005, 8th ed.)

STAT3809 Current topics in actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof W K Li, Statistics and Actuarial Science		
Course Aim	This course aims at providing practical elements for actuarial students including daily life actuarial practice and the basic capability to understand, research in and handle the laws as and when situations would arise, which will benefit students in their coming future career.		
Course Contents	This course covers a full range of topics related to both areas including 1) Practical Actuarial Practice and 2) Actuaries' Legal Thinking. For Practical Actuarial Practice, it covers the major practical topics in both Life and Casualty areas. For Life Insurance, it covers the full picture of actuarial control cycle including Product Pricing, Valuation, Financial Reporting and Experience Analysis. For General Insurance, it covers the backbone areas including Product Pricing and Valuation. For Actuaries' Legal Thinking, after a quick coverage on the "why", this condensed part of the course is to help future actuaries to have basic understanding of how the law operates, the fundamentals in core legal subjects such as the Legal System, Contract and Tort, how to conduct preliminary legal researches, how to work with lawyers, how to interpret written judgment and current issues in the law. This part will not be completed without a devoted section on studying some basic legal doctrines in the law of insurance.		
Learning Outcomes	On successful completion of the course, students should be able to: - have a basic understanding regarding Actuarial Control Cycle from A to Z for Life Insurance and General Insurance; - possess some experience regarding fundamental actuarial practice through practical project; - possess basic understanding of the legal system in Hong Kong; - possess fundamental knowledge in certain core legal aspects such as the law of contract and the law of tort; - possess fundamental knowledge of the law of insurance; - conduct elementary legal researches when facing with legal problems; - understand the basic elements of a routine judgment, the matrix of the facts and the law involved.		
Pre-requisites	(Pass in STAT2801, or already enrolled in this course; or Pass in STAT3801, or already enrolled in this course); and For BSc(Actuarial Science) students only.		

Offer in 2012 - 2013	2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures.		
Assessment Method	100% coursework assessment based on assignments, practical project and class test(s)		
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 Website	webct.hku.hk		

STAT3810 Risk theory (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K C Cheung, Statistics and Actuarial Science		
Course Aim	Risk theory is one of the main topics in actuarial science. Risk theory is the applications of statistical models and stochastic processes to insurance problems such as the premium calculation, ruin probability, etc.		
Course Contents	Severity models; frequency models; collective risk models;coverage modifications; ruin theory; risk measures; simulation.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand the individual risk model and the collective risk model, evaluate the distribution and expectation of the total claim amounts. - Estimate the premium of a policyholder and the total claim amounts using the information of the claim amounts made in previous years. - Calculate some commonly used risk measures and explain their use and limitation. - Apply simulation methods within the context of actuarial models.		
Pre-requisites	Pass in STAT2803, or already enrolled in this course; or Pass in STAT2303 or MATH2603		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test, etc.		
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.		
References	Klugman S. A., Panjer H. H., & Willmot G. E.: Loss Models: From Data to Decisions (John Wiley & Sons, Inc., 2008, 3rd edition) Bowers, N.L., Gerber, H.U., Hickman, J.C., Jones, D.A. and Nesbitt, C.J.: Actuarial Mathematics (The Society of Actuaries, 1977, 2nd edition) Gollier, C.: The Economics of Risk and Time (The MIT Press, 2001)		
Course Website	webct.hku.hk		

STAT3811 Survival analysis (6 credits)		**Academic Year**	**2012**

Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E K F Lam, Statistics and Actuarial Science		
Course Aim	This course is concerned with how models which predict the survival pattern of humans or other entities are established. This exercise is sometimes referred to as survival-model construction.		
Course Contents	The nature and properties of parametric and nonparametric survival models will be studied. Topics to be covered include: the introduction of some important basic quantities like the hazard function and survival function; some commonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation of the survival distribution by maximum likelihood estimation method; nonparametric estimation of the survival functions from possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; and the kernel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival functions by means of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional hazards regression model; and multivariate survival analysis.		
Learning Outcomes	On successful completion of the course, students should be able to: - acquire a clear understanding of the nature of failure time data or survival data, a generalization of the concept of death and life, - perform estimation for some commonly used survival models under different types of censoring mechanisms, - analyze survival data using the Cox's semiparametric proportional hazards model, - extend the Cox's model to a multivariate setup to accommodate multivariate survival data.		
Pre-requisites	Pass in STAT2802, or already enrolled in this course; or Pass in STAT2301 or STAT2801		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
References	Cox, D. R. and Oakes, D.: Analysis of Survival Data (Chapman and Hall, 1984) Hosmer, D. W. and Lemeshow, S.: Applied Survival Analysis: Regression Modeling of Time to Event Data (Wiley, 1999) Klein, J. P. and Moeschberger, M. L.: Survival Analysis: Techniques for Censored and Truncated Data (Springer Verlag, New York, 2005, 2nd ed.)		
Course Website	webct.hku.hk		

STAT3819 Project in statistics and actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		
Course Aim	Each year a few projects suitable for Actuarial Science students will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation.		
Course Contents	These projects, under the supervision of individual staff members, involve the applications of statistics and/or probability in a wide range of problems of practical and/or academic interests.		
Learning Outcomes	On successful completion of the course, students should be able to: - formulate meaningful research problems; - learn and apply advanced techniques in probability and/or statistics to solve real life problems; - summarize and present research findings in a professional manner.		
Pre-requisites	For BSc(Actuarial Science) students only.		
Offer in 2012 - 2013	Year long	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No regular lectures. The student is expected to meet and discuss with a supervisor regularly in the course of the project.		
Assessment Method	Written report (50%), oral presentation and participation (50%)		
Course Grade	A+ to F		
Grade Descriptors			

	A	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]
	B	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.
	C	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.
	Fail	Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.
Course Website	webct.hku.hk	
Remarks	Approval is subject to past academic performance.	

STAT3820 Pension Funds and Pension Mathematics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Ma, Statistics and Actuarial Science		
Course Aim	This course covers the basics of pension plan design and pension fund management, as well as the fundamentals of pension plan valuations using different actuarial cost methods. The students will be introduced to the application of actuarial valuation techniques to the funding and accounting of pension plans.		
Course Contents	The following topics will be covered: Fundamentals of private pension plans; pricing and valuation of pension obligations; actuarial cost methods and their effects on cost patterns; selection of actuarial assumptions; principles of asset and liability management.		
Learning Outcomes	On successful completion of the course, students should be able to: - calculate the pension benefits in accordance with the provisions of a pension plan; - calculate the normal cost and actuarial liabilities using different actuarial cost methods; - perform gain and loss analyses for pension valuations; - select appropriate assumptions and methods for funding or accounting purposes; - interpret the valuation results presented in actuarial valuation reports; - develop models for asset and liability projections		
Pre-requisites	Pass in STAT3801; and For BSc(Actuarial Science) students only.		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	This course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test.		
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.	
Textbooks	Arthur W. Anderson: Pension Mathematics for Actuaries (2006, 3rd edition). McGill, D.M., Brown, K.N. , Haley, J.J., Schieber, S.J.: Fundamentals of Private Pensions (2010, 9th Edition)		
References	William H. Aitken: Problem-Solving Approach to Pension Funding and Valuation, (2nd edition). Morneau Sobeco: Handbook of Canadian Pension & Benefit Plans (2008, 14th Edition) Actuarial Standard of Practice No. 4, Measuring Pension Obligations Actuarial Standard of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations Actuarial Standard of Practice No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations		
Course Website	webct.hku.hk		

STAT3821 Financial economics II (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E C K Cheung, Statistics and Actuarial Science		
Course Aim	This course is an advanced course on the option pricing theory. The course covers Black-Scholes equation and stochastic calculus, and interest models. This course and STAT2812/STAT2806 will cover all the concepts, principles and techniques needed for SoA Exam MFE.		
Course Contents	Brownian motion; introduction to stochastic calculus; arithmetic and geometric Brownian motion; Ito formula; Sharpe ratio and risk premium; Black-Scholes equation; risk-neutral stock-price process and option pricing; option's elasticity and volatility; Vasicek, Cox-Ingersoll-Ross, and Black-Derman-Toy models; delta-hedging for bonds and the Sharpe-ratio equality constraint; Black's model; options on zero-coupon bonds; interest-rate caps and caplets.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand Brownian motion and its properties - Understand the Ito calculus and Ito formula - Understand the Black-Scholes model and option pricing theory - Understand the delta hedging and some basic risk management methods - Understand some basic interest rate models		
Pre-requisites	Pass in MATH2603 or STAT2803 or STAT2806 or STAT2812 or STAT3316		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test		
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.		
Textbooks	Robert L. McDonald: Derivatives Markets (2nd edition), Chapters 20, 21 and 24.		
References	John Hull: Options, Futures and Other Derivatives (2008, 7th edition) Alison Etheridge: A Course in Financial Calculus (2002) Steven Shreve: Stochastic Calculus for Finance II Continuous-Time Models (2008)		
Course Website	webct.hku.hk		

STAT3822 Risk Theory II (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr J K Woo, Statistics and Actuarial Science		
Course Aim	This course is an advanced course in risk theory which extends various topics discussed in STAT3810. It discusses utility theory, ruin theory, aggregate claims process, and related topics.		
Course Contents	Utility theory; discrete ruin model; compound Poisson risk model; ruin probability; reinsurance; adjustment coefficient; Lundbergs inequality; Tijms approximation; non-homogeneous birth process; contagion model; mixed Poisson process; inflation model; IBNR (Incurred But Not Reported) claims; mixed Erlang distributions; stop-loss moments; equilibrium distributions.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand utility theory including some commonly used utility functions, Jensens inequality, risk aversion and utility maximization - define discrete and continuous ruin models - calculate the adjustment coefficient, Lundbergs inequality and Tijms approximation in ruin theory - understand the effect of reinsurance and change of parameters on ruin probability - understand non-homogeneous birth process and its applications as contagion models for claim frequencies - understand mixed Poisson process and its applications including the inflation model and the IBNR model - derive the relationship between stop-loss moments and equilibrium distributions		
Pre-requisites	Pass in STAT3810		
Offer in 2012 - 2013	1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		

Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.
Assessment Method	One 3-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials, and a class test, etc.
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.
References	- Klugman S.A., Panjer H.H., & Willmot G.E.: Loss Models: From Data to Decisions (John Wiley & Sons, 2007, 3rd edition). - Kaas R., Goovaerts M., Dhaene J., & Denuit M.: Modern Actuarial Risk Theory (Springer, 2004, 1st edition). - Bowers N.L., Gerber H.U., Hickman J.C. & Jones D.A.: Actuarial Mathematics (Society of Actuaries, 1997, 2nd edition). - Willmot G.E. & Lin X.S.: Lundberg Approximations for Compound Distributions with Insurance Applications (Springer, 2000, 1st edition).
Course Website	webct.hku.hk

STAT3988 Statistics internship (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr P L H Yu, Statistics and Actuarial Science		
Course Aim	This course is offered to students majoring in Statistics or Risk Management who take on a minimum of 160 hours of internship work related to his major disciplines. It provides students with first-hand experience in the applications of academic knowledge in a real-life work environment.		
Course Contents	Upon completion of the internship, each student is required to submit a written report and to give a presentation on his/her internship experience. The report should emphasize important working/educational experiences encountered by the student during his/her internship. In many situations, this would mean a report of the project(s) that the student has been involved in during his/her internship.		
Learning Outcomes	On successful completion of the course, students should be able to: - gain first-hand work experience in an industry related to statistics and risk management; - apply knowledge in statistics and risk management to solve practical problems in the work place; - understand contexts for specific quantitative skills developed in basic statistics and risk management courses; - communicate specialist knowledge in statistics and risk management to non-experts in a work environment.		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	1st sem 2nd sem Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	No formal lectures, but students are expected to work for at least 160 hours (lunch hour excluded) in at least 20 working days.		
Assessment Method	Upon completion of the internship, each student is required to submit a written report and to give an oral presentation on their internship experience. Supervisors will assess the students based on their performance during the internship period (in the case of internships outside the university, the internal supervisor will assess the student based on the feedback by the external supervisor).		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Course Website	webct.hku.hk		
Remarks	Students are expected to have satisfactorily completed their Year 2 study. Special consideration be given to those who have completed Year 1. Satisfactory completion of this course can be counted towards the Experiential Learning requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on Pass or Fail basis. Students who are interested to enrol in this course should contact the Department to obtain the approval. Visit http://www.hku.hk/science/current/bsc/internship/ for more information. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

STAT3989 Essential IT skills for statistical and risk analysts (0 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	48
Course Co-ordinator	Dr C W Kwan, Statistics and Actuarial Science		
Course Aim	This course is offered to students majoring in Statistics or Risk Management and students from BSc in Actuarial Science. It aims to enhance students' IT knowledge and skills which are not covered in the current curriculum but are essential for career development of statistical and risk analysts. The course may contain a variety of activities including computer hand-on workshops on VBA programming, MS-office and SPSS, and group projects.		
Course Contents	Training in MS-Office includes VBA basic and macro, Access and SQL, with applications in statistical and risk analyses. Training in SPSS includes data management and statistical analysis. Tranining in other related software will be considered subject to the Departmental approval. Firm visits and career talks. Group project. (Students are expected to have completed their Year 2 study. Special consideration will be given to those who have completed Year 1. Students who are interested to enroll in this course should contact the Department.)		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand VBA in MD-Excel - Understand data management by MS-Access and SQL - Understand data management and statistical analysis by SPSS - Understand financial data management and analysis using appropriate software		
Pre-requisites	Students are expected to have satisfactorily completed their Year 2 study.		
Offer in 2012 - 2013	Summer	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Teaching Hours	At least 120 working hours of experiential learning activities consists of at least 80 hours of demonstration and hand-on exercises of the computer software conducted in a computer laboratory, and 40 hours for a group project.		
Assessment Method	100% course work involves attendance (10%), exercises and quizzes (60%), group project (30%). The course will be assessed on a Pass or Fail basis.		
Course Grade	Pass/Fail		
Grade Descriptors	Pass: Demonstrate ability of applying knowledge to solve problems in the workplace. Successfully handle and carry out the work required in the job or assigned by supervisor(s). Establish effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfill the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Fail: Demonstrate very limited or no ability of applying knowledge to solve problems in the workplace. Fail to handle or carry out the work required in the job or assigned by supervisor(s). Fail to establish effective collaboration or communication with supervisor (s), other colleagues, or clients in the job. Fail to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.		
Course Website	webct.hku.hk		
Remarks	1. This course is exclusively for 2nd and 3rd year BSc Risk Management & Statistics major students and BSc in Actuarial Science students only. Priority would be given to those Year 3 students who have not satisfied any Experiential Learning (EL) requirements. 2. Students who take this course for satisfying the EL requirement must take an additional 6-credit advanced level Science course in their primary Science major to complete the credit requirement. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.		

STAT6109 Research methods in statistics (6 credits)		Academic Year	2012
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof S M S Lee, Statistics and Actuarial Science		
Course Aim	This course introduces some statistical concepts and methods which potential graduate students will find useful in preparing for work on a research degree in statistics. Focus is on applications of state-of-the-art statistical techniques and their underlying theory.		
Course Contents	The contents will be chosen from the following topics: 1. Basic asymptotic methods: modes of convergence; stochastic orders; laws of large numbers; central limit theorems; delta method; Edgeworth expansions; saddlepoint approximations. 2. Parametric and nonparametric likelihood methods: high-order approximations; profile likelihood and its variants; signed likelihood ratio statistics; empirical likelihood. 3. Nonparametric statistical inference: sign and rank tests; Kolmogorov-Smirnov test; nonparametric regression; density estimation; kernel methods. 4. Robust methods: measures of robustness; M-estimator; L-estimator; R-estimator; estimating functions. 5. Computationally-intensive methods: cross-validation; bootstrap; permutation methods. 6. Sequential analysis: sequential probability ratio test; sequential estimation. 7. Model selection using information criteria. 8. Other topics as determined by the instructor.		
Learning Outcomes	On successful completion of the course, students should be able to: - comprehend the language and technicalities found in statistical research literature; - understand the use of standard mathematical tools for conducting statistical research; - apply a variety of research tools to solve standard statistical problems; acquire exposure to some developments in contemporary statistical research.		
Pre-requisites	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT3306.		
Offer in 2012 - 2013	Not offered	**Examination**	Dec
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and 12 hours of tutorials		

Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments and a class test
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.
Textbooks	DasGupta, A. (2008). Asymptotic Theory of Statistics and Probability. Springer:. Efron, B. and Tibshirani, R.J. (1993). An Introduction to the Bootstrap. Chapman & Hall: New York. Owen, A.B. (2001). Empirical Likelihood. Chapman & Hall: Boca Raton. Shao, J. (1999). Mathematical Statistics. Springer: New York. Wasserman, L. (2006). All of Nonparametric Statistics. Springer.
Course Website	webct.hku.hk

STAT6110 Advanced probability (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof Y Lam, Statistics and Actuarial Science		
Course Aim	This course provides an introduction to measure theory and probability. The course will focus on some basic concepts in theoretical probability which are essential for students to read research papers in actuarial science, probability and statistics.		
Course Contents	Contents include: sigma-algebra, measurable space, measure and probability, measure space and probability space, measurable functions, random variables, integration theory, monotone convergence theorem, Fatou's lemma, dominated convergence theorem, characteristic functions, convergence of random variables, weak convergence, probabilistic inequalities, L to the power 2 - and Hilbert spaces, conditional expectation, martingales and applications.		
Learning Outcomes	On successful completion of the course, students should be able to: - Understand the fundamental measure theory and probability theory. - Learn the general concept of integration, understand the monotone convergence theorem, Fatou's lemma and dominated convergence theorem. - Understand the concept of conditional expectation. - Have some elementary knowledge of martingale.		
Pre-requisites	Pass in STAT2303 or STAT2803. This course is mutually exclusive to STAT3316.		
Offer in 2012 - 2013	Not offered	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and 12 hours of tutorials		
Assessment Method	One 2-hour written examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, tutorials, and a class test, etc		
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.		
References	Jean Jacod and Philip Protter: Probability Essentials (Universitext, Springer-Verlag, New York, 2004, 2nd edition) Chow Y. H. and Teicher H.: Probability Theory (Springer-Verlag, New York, 1997, 3rd edition) Chung K. L.: A Course in Probability Theory (Academic Press, 2001, 3rd edition)		
Course Website	webct.hku.hk		

STAT6111 Computational statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G Tian, Statistics and Actuarial Science		
Course Aim	This course aims to give undergraduate and postgraduate students in statistics a background in modern computationally-intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods.		
Course Contents	Contents include: Numerical optimization and integration, EM algorithm and its variants, Simulation and Monte Carlo integration, Importance sampling and variance reduction techniques, Markov chain Monte Carlo methods, and Bootstrap methods.		
Learning Outcomes	On successful completion of the course, students should be able to: - understand the importance of the technique for generating random variables in Bayesian statistics, Monte Carlo integration and bootstrapping methods; - realize the advantages and disadvantages of the Newton-Raphson algorithm and the Fisher scoring algorithm and apply them to fit generalized linear models; - understand the essence and basic principle of the EM-type algorithms and MM-type algorithms, realize their range of application, and apply them to solve practical problems; - apply EM-type algorithms to find the posterior mode and apply Markov chain Monte Carlo methods to generate posterior samples; - apply Bootstrap methods to obtain estimated standard errors of estimators and confidence intervals of parameters for both parametric and non-parametric cases.		
Pre-requisites	Pass in STAT2301 or STAT2804. This course is mutually exclusive to STAT3317.		
Offer in 2012 - 2013	Not offered	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	36 hours of lectures and 12 hours of tutorials		
Assessment Method	One 2-hour written examination (50% weighting) and a coursework assessment (50% weighting) based on assignments, practical work, and a term test		
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.	
Textbooks	Tan, M., Tian, G.L. and Ng, K.W: Bayesian Missing Data Problems: EM, Data Augmentation and Non-iterative Computation (Chapman & Hall/CRC, Boca Raton, 2010).		
References	Givens, G.H. and Hoeting, J.A.: Computational Statistics (Wiley, 2005) Robert, C.P. and Casella, G.: Monte Carlo Statistical Methods (Springer, 2005, 2nd edition)		
Course Website	webct.hku.hk		

STAT6114 Advanced statistical modelling (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr J F Yao, Statistics and Actuarial Science		
Course Aim	This course introduces modern methods for constructing and evaluating statistical models and their implementation using popular computing software, such as SAS or R.		
Course Contents	It will cover both the underlying principles of each modelling approach and the statistical properties of the model estimation procedures. Topics from: (i) Review of multiple linear regression and its extensions: variable selection; cross validation; the bootstrap; diagnostics; stochastic regressors; shrinkage methods; (ii) Random effects and mixed models; (iii) Nonparametric and semi-parametric methods: kernel density estimation; local kernel regression; selection of smoothing parameters; (iv) Additive models; semi-parametric mixed models; generalized additive models; and (v) Basic state space modelling for time series data.		
Learning Outcomes	On successful completion of the course, students shold be able to: - Undersatnding the definition and basic characteristics of each statistical model; - Identifying for a given set of data the most suitable stistical model and tools to use; - In perticular, skills of building a scoring model for various management and prediction problems involving a binary response; - Skills of emplying the powerful tool of kernel density estimation using SAS or R for real data mining problems; - Skills of analysing data with SAS procedures PROC LOGISTIC, PROC GENMOD, PROC GLM, PROC UNIVARIATE (option KERNEL) or equivalent R Packages.		

Pre-requisites	Pass in STAT2301		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	24 hours of lectures and 12 hours of tutorials		
Assessment Method	One 2-hour examination (50% weighting) and a coursework assessment (50% weighting) based on assignments and class test(s)		
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.		
Textbooks	R.H. Myers et al.: Genelized Linear Models (2nd ed.), Wiley W. Hardle et al., 2004: Nonparametric and Semi-parametric Models. Springer		
References	M. Panik, 2009: Regression Modeling, CRC Press		
Course Website	webct.hku.hk		

STAT6115 Advanced quantitative risk management and finance (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof W K Li, Statistics and Actuarial Science		
Course Aim	This course covers statistical methods and models of importance to risk management and finance and links finance theory to market practice via statistical modeling and decision making. Emphases will be put on empirical analyses to address the discrepancy between finance theory and market data.		
Course Contents	Basic Monte Carlo and Quasi-Monte Carlo Methods; Variance Reduction Techniques; Simulating the value of options and the value-at-risk for risk management; Review of univariate volatility models; multivariate volatility models; Extreme value theory for risk management.		
Learning Outcomes	On successful completion of the course, students should be able to: - apply Monte Carlo methods to determine the value of options and other derivative securities; - predict volatility of a set of securities using appropriate models; - estimate the value-at-risk under extreme value theory.		
Pre-requisites	Pass in STAT3322		
Offer in 2012 - 2013	2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Teaching Hours	The course consists of 36 lectures and 12 tutorials/example classes.		
Assessment Method	One 2-hour written examination (75% weighting) and a coursework assessment (25% weighting) based on assignments, tutorials and a class test		
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.		
References	McLeish, Don L.: Monte Carlo Simulation & Finance. (Wiley, 2005). Glasserman, Paul: Monte Carlo Methods in Financial Engineering. (Springer, 2003). Danielsson Jon: Financial Risk Forecasting (Willy 2011) McNeil, A. J., Frey, R. & Embrechts, P.: Quantitative Risk Management (Princeton, 2005) Tsay, R.S.: Analysis of Financial Time Series (Wiley, 2010, 3rd edition)		
Course Website	webct.hku.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
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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
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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
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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
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):
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Dr Y Chiu
Department of Politics and Public Administration, Faculty of Social Sciences
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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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Teacher(s):
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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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Teacher(s):
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Dr J C S Pun
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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

Course Co-ordinator:
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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

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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:
Professor D L Phillips
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Teacher(s):
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Dr W T Chan
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Dr A S T Wong
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Dr B L Lim
School of Biological Sciences, Faculty of Science
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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:
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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:
Dr N K Tsing
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Teacher(s):
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Dr T W Ng
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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:
Dr A Djurisic
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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

BSc Degree Regulations

SCIENCE

SECTION IX Degree Regulations

Regulations for First Degree Curricula (for students admitted to the first year in 2012-2013 under the 3-year '2010 curriculum')

REGULATIONS FOR FIRST DEGREE CURRICULA[1]

(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 for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 60 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.

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

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major programme or discipline 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.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

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[1] These regulations are applicable to candidates admitted under the 3-year '2010 curriculum' to the first year of first degree curricula in 2012-13. 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 before 2012-13.)

'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' is the number of 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' is 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 6 credits in English language enhancement;
(b) successful completion of 3 credits in Chinese language enhancement[2]; and
(c) successful completion of 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry.

UG 6 Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

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 satisfactorily completed 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.

[2] 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*.

UG 8 Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows[3]:

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.

UG 9 Honours classifications:

(a) Honours classifications shall be awarded in five divisions[4]: 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.

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[3] UG 8 is not applicable to the BDS and MBBS curricula.
[4] UG 9 is not applicable to the BChinMed, BDS and MBBS.

Regulations for First Degree Curricula (for students admitted to the first year in 2010-2011, 2011-2012 and admitted directly to the second year in 2011-2012 and 2012-2013)

REGULATIONS FOR FIRST DEGREE CURRICULA[1]

(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 for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 60 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.

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

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major programme or discipline 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.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

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1 These regulations are applicable to candidates admitted to the first year of first degree curricula in 2010-11 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 2009-10 for the Regulations for First Degree Curricula applicable to cohorts admitted before 2010-11.)

‘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, and is calculated by the total of the product of grade points earned for each course attempted (including failed courses) and its credit value being 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’ is the number of 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.

‘Weighted Grade Point Average’ or ‘Weighted GPA’ is the GPA in respect of courses attempted by a candidate calculated with weighted factors defined by the Board of the Faculty.

‘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’ is 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 required to discontinue 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, 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 6 credits in English language enhancement;

(b) successful completion of 3 credits in Chinese language enhancement[2]; and

(c) successful completion of 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry.

UG 6 Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

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 satisfactorily completed 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.

[2] 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*.

UG 8 Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows[3]:

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'.

3 UG 8 is not applicable to the BDS and MBBS curricula.

Regulations for First Degree Curricula (for students admitted to the first year in 2009-2010 or before and admitted directly to the second year in 2010-2011)

REGULATIONS FOR FIRST DEGREE CURRICULA[1]

(see also General Regulations G1-20)

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.

'Course' means a course of study, normally with a credit value (expressed as a number of units, known also as credit-units or credits) as defined in the syllabuses for a degree curriculum.

'Core course' means any of the courses that are mainly offered to candidates following the degree curriculum concerned and must be completed by them in order to fulfill the curriculum requirements.

'Elective course' or 'Elective' means any of the courses other than core courses that can be taken by candidates in order to complete the degree curriculum.

'Syllabus' means courses or a combination of courses taught by departments, centres, schools and programmes, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have taken and/or 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 weight assigned to each course relative to the total study load under a degree curriculum. The number of credits is normally indicative of the contact hours, study time and/or candidate workload associated with the course. Candidates who satisfactorily complete courses with a credit value earn the credits of these courses.

'Semester Grade Point Average' or 'Semester GPA' is the combined grade average of all courses attempted by a candidate (including failed courses) during a given semester, where each course is given a weight, normally equal to its credit-unit value.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the combined grade average of all courses completed successfully by a candidate (failed courses are excluded) at the time of calculation, where each course is given a weight, normally equal to its credit-unit value.

'Weighted Grade Point Average' or 'Weighted GPA' is the combined grade average of all courses taken by a candidate weighted by factors (such as the level of the courses) defined by the Board of the Faculty .

A 'transcript' is 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. The amount of advanced credits to be granted shall be determined by the Board of a Faculty, in accordance with the following principles:

(a) under the provisions in Statute III.5, a minimum of two semesters of study at this University shall be required before the candidate is considered for the award of the degree; and
(b) a minimum of 60 credits shall be gained in this University.

[1] These regulations are applicable to candidates admitted to the first year of first degree curricula in or after 1998-99, except those in the Bachelor of Medicine and Bachelor of Surgery and the Bachelor of Dental Surgery curricula.

Advanced credits granted shall not normally be included in the calculation of the cumulative GPA, but, if so decided by the Board of Faculty, may be recorded on the transcript of the candidate.

UG 3 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to requirements prescribed in the regulations and syllabuses governing the degree curricula:

(a) Successful completion of a 3-unit English language enhancement course; and a 3-unit Chinese language enhancement course[1];

(b) Successful completion, in the manner specified in the regulations and syllabuses governing the degree curricula, of one of the following courses[2]:
  (i) a 3-unit course or a 6-unit IT-integrated course in Humanities and Social Sciences Studies; or
  (ii) a 3-unit course or a 6-unit IT-integrated course in Science and Technology Studies.

(c) Successful completion, in the manner specified in the regulations and syllabuses governing the degree curricula, of one of the following courses[2]:
  (i) a 3-unit course or a 6-unit IT-integrated course in Culture and Value Studies; or
  (ii) a 3-unit course which is outside the candidates' own degree curricula, as an elective course; or
  (iii) a Common Core Course which is outside the candidates' own degree curricula.

(d) Either (i) successful completion of a 6-unit IT-integrated course in Humanities and Social Sciences Studies, Science and Technology Studies, or Culture and Value Studies, under (b)(i) or (ii) or (c)(i) above;
  or (ii) obtaining a pass in an information technology proficiency test;
  or (iii) successful completion of a 3-unit course in information technology;
  or (iv) satisfying the information technology proficiency requirements as specified in the regulations and syllabuses governing the degree curricula.

UG 4 Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 3 by the Senate in exceptional circumstances.

UG 5 Grading system:

The grades, their standards and the grade points for assessment shall be as follows[3,4]:

Grade	*Standard*	*Grade Point*
A+	Excellent	4.0
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

[1] Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement, see *Regulation UG4*.

[2] Students failing to successfully complete courses in Humanities and Social Sciences Studies, Science and Technology Studies or Culture and Value Studies by 2009-10 shall be required to satisfy the requirements in (b) and (c) by taking 6-credit courses in the Common Core Curriculum to be offered from 2010-11 onwards.

[3] UG5 is not applicable to the BDS and MBBS curricula.

[4] Special permission may be given for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'.

REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 3-year curriculum to the first year of the BSc degree curriculum in the academic year 2012-2013 and students admitted directly to the 2nd year in 2013-2014.
(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 2, 3 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 six semesters of full-time study, extending over not fewer than three 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 five 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 180 credits, in the manner specified in these regulations and the syllabuses.

(c) Candidates shall take at least 90 credits of Science courses, of which no fewer than 60 credits must be gained from advanced Science courses, including all required courses of the major programme of the BSc degree curriculum, and the Faculty elective courses.

(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 216 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 360 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 satisfactorily completed 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.

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 180 credits, comprising

  (i) at least 90 credits of Science courses, of which no fewer than 60 credits must be gained from advanced Science courses; and

  (ii) all required courses as prescribed in the major programme of the BSc degree curriculum; and the Faculty elective courses.

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.

Regulations for the Degree of Bachelor of Science * (BSc)

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 2, 3 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 six semesters of full-time study, extending over not fewer than three 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 five academic years.

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.

***** These Regulations apply to students admitted to the first year of study for the Degree of BSc in the academic years 2010-2011 and 2011-2012.

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[1] This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

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 180 credits, in the manner specified in these regulations and the syllabuses.

(c) Candidates shall take at least 90 credits of Science courses, of which no fewer than 60 credits must be gained from advanced Science courses, including all required courses of the major programme of the BSc degree curriculum, and the Faculty elective courses.

(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 216 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 360 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 required to discontinue 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, 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 satisfactorily completed 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.

Degree classification

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 180 credits, comprising

(i) at least 90 credits of Science courses, of which no fewer than 60 credits must be gained from advanced Science courses; and

(ii) all required courses as prescribed in the major programme of the BSc degree curriculum; and the Faculty elective courses.

Sc9 The degree of Bachelor of Science shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. A list of candidates who have successfully completed all the degree requirements shall be posted on Faculty notice boards.

Regulations for the Degree of Bachelor of Science * (BSc)

Terminology
Sc1 In these Regulations, and in the Syllabuses for the degree of Bachelor of Science, unless the context otherwise requires -

"Study programme" means a combination of core, elective and general education courses as specified in the syllabus, and approved by the Faculty Board.

"Science Course" means any course offered by the Faculty of Science or the Department of Biochemistry.

"Advanced course" means any level 2, 3 or above course offered by the Faculty of Science or the Department of Biochemistry.

Admission to the Bachelor of Science Degree
Sc2 To be eligible for admission to the degree of Bachelor of Science 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 the regulations that follow and the syllabuses of the degree.

Length of Study
Sc3 The curriculum for the degree of Bachelor of Science shall normally require six semesters of full-time study, spread over three academic years, excluding summer semesters. Candidates shall not be permitted to complete the curriculum in more than five academic years, except with the approval of the Faculty Board.

Curriculum Requirements
Sc4 To complete the curriculum, candidates shall
(a) satisfy the requirements prescribed in UG3 of the Regulations for First Degree Curricula;
(b) take no fewer than 180 credits of different courses, in the manner specified in the syllabuses; and
(c) follow the required number of core and elective courses as prescribed in the syllabuses, normally equivalent to 60 credits for each year of study. For each semester, candidates shall select, no less than 24, nor more than 36 credits of courses. Should students wish to deviate from the prescribed programme structure or select fewer than 24 or more than 36 credits of courses in a semester, approval must be sought from the Dean via the Head of Department.

Selection of Courses
Sc5 Candidates select courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each academic year. Changes to the selection of course(s) may be made only during a period specified by the Faculty, normally in the first two teaching weeks of the semester to which the course begins. Such changes shall not be reflected in the transcripts of candidates. Requests to change after the specified period of a semester shall not be considered, and candidates withdrawing from any course without permission after the specified period of a semester shall be given a failed grade.

***** These Regulations apply to students admitted to the first year of study for the Degree of BSc in the academic year 2009-2010 and students admitted directly to the second year in the academic year 2010-2011 only.

Assessment

Sc6 Candidates shall have passed a course if the Board of Examiners is satisfied by their performance in the assessment, which may be conducted in any one or any combination of the following manners: written examinations or tests, continuous assessment of performance, laboratory work, field work, research or project reports, or in any other manner as prescribed in the syllabuses. Grades shall be awarded in accordance with UG 5 of the Regulations for New Degree Curricula.

Sc7 Candidates failing to fulfil the laboratory or fieldwork component of a course, if any, may result in failure of the whole course.

Sc8 Candidates who fail a course may retake the course and both grades shall be recorded on the transcript. In the calculation of the semester GPA, all credit-units attempted are counted. In the calculation of the cumulative GPA, only credits-units gained are counted.

Sc9 Candidates shall not be permitted to repeat a course for which they have received a pass grade for upgrading purposes.

Unsatisfactory Progress

Sc10 Candidates who have passed less than 36 credits of courses in any academic year or obtained a Semester or Year GPA of 1.2 or below may be required to discontinue their studies in accordance with General Regulation G12.

Absence from Examination

Sc11 Failure to take the examination as scheduled, normally results in automatic course failure. Candidates who are unable because of illness to be present at any examination of a course, may apply for permission to present themselves for examination at some other time. Any such application shall be made on the form prescribed within two weeks of the day of the examination.

Advanced Standing

Sc12 Advanced credits granted under UG2 of the Regulations for First Degree Curricula shall be recorded on the transcript of candidates but not included in the calculation of the cumulative GPA. Candidates with advanced standing credits shall normally have their degree classification determined separately by the Faculty Board.

Degree Classification

Sc13 To be eligible for the award of the degree of Bachelor of Science, candidates shall pass a minimum of 180 credits of courses, including

(a) 6 credits of courses in English language enhancement;
(b) 3 credits of course in Chinese language enhancement;
(c) a 3-credit course from those listed under the Humanities and Social Sciences studies[#];
(e) satisfactory completion of IT proficiency requirement, as specified by the Board[@];
(f) at least 90 credits of Science courses, of which no less than 60 credits must be gained from advanced courses; and
(g) all required courses as prescribed in the major and minor curriculum; and Faculty elective courses.

Sc14 The degree of Bachelor of Science 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 Faculty Board and a list of candidates who have successfully completed all the degree requirements shall be posted on Faculty noticeboards.

[#] Students may take a 6-credit IT-integrated course in Humanities and Social Sciences Studies offered in 2009-2010 or a 6-credit course in the Common Core Curriculum to be offered from 2010-2011 onwards to satisfy this requirement.

[@] IT proficiency requirement can be satisfied by taking Information technology proficiency test or a 6-credit IT-integrated course in Humanities and Social Science Studies.

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	
SEP-12							1	1	
	2	3	4	5	6	7	8	2	
	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								
OCT-12		[1]	[2]	3	4	5	6	6	
	7	8	9	10	11	12	13	7	
	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
NOV-12					1	2	3		
	4	5	6	7	8	9	10	11	
	11	12	13	14	15	16	17	12	
	18	19	20	21	22	23	24	13	
	25	26	27	28	29	30		14	
DEC-12							1		
	2	3	4	5	6	7	8	15	Last Day of Teaching: Dec 8, 2012
	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>							
JAN-13			[1]	2	3	4	5	19	
	6	7	8	9	10	11	12	20 (Break)	
	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	
FEB-13						1	2		
	3	4	5	6	7	8	9	24	Class Suspension Period for the Lunar New Year: Feb 9 - 15
	10	[11]	[12]	[13]	14	15	16	25 (Suspension)	
	17	18	19	20	21	22	23	26	
	24	25	26	27	28			27	
MAR-13						1	2		
	3	4	5	6	7	8	9	28	
	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								
APR-13		[1]	2	3	[4]	5	6	32	
	7	8	9	10	11	12	13	33	
	14	15	16	17	18	19	20	34	
	21	22	23	24	25	26	27	35	
	28	29	30					36	
MAY-13				[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
	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	
JUN-13							1		
	2	3	4	5	6	7	8	41 (Break)	
	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**
JUL-13		[1]	2	3	4	5	6	45	
	7	8	9	10	11	12	13	46	
	14	15	16	17	18	19	20	47	
	21	22	23	24	25	26	27	48	
	28	29	30	31				49	
AUG-13					1	2	3		
	4	5	6	7	8	9	10	50	
	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