REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE (BSc[ActuarSc])

These regulations apply to students admitted in the academic year 2004-2005 and thereafter.

(See also General Regulations and Regulations for First Degree Curricula)

The degree of Bachelor of Science in Actuarial Science is an undergraduate degree, awarded for the satisfactory completion of a prescribed course of specialist training in actuarial science.

Definitions

AS1[(1)] In these Regulations, and in the Syllabuses for the degree of BSc(ActuarSc), unless the context otherwise requires —

'Course' means a course of instruction which normally carries 6 credits or in some cases 3 credits or multiples of 3, leading to one examination paper as defined in the syllabus;

'Paper' means one or more of the following tests: a theoretical examination paper, a practical examination paper, an assessment of field practice, a thesis, and a dissertation, or other assignments as prescribed in the syllabus of the course leading to it;

'Credits' means the weight assigned to each course relative to the total study load. The number of credits is indicative of the contact hours and/or study time associated with the course on a weekly basis;

'Pre-requisite' means a course which candidates must have completed as specified to the satisfaction of the Head of Department before being permitted to take the course in question.

Admission to the degree

AS2 To be eligible for admission to the degree of Bachelor of Science in Actuarial Science candidates shall

(a) comply with the General Regulations;
(b) comply with the Regulations for First Degree Curricula; and
(c) complete the curriculum in accordance with the regulations that follow.

Length of study

AS3 The curriculum shall normally extend over three academic years consisting of six semesters of full-time study, excluding the summer semesters. Candidates shall not in any case be permitted to complete the curriculum in more than four academic years, which being the maximum period of registration.

Completion of the curriculum

AS4 To complete the curriculum, candidates shall:

(a) satisfy the requirements prescribed in UG3 of the Regulations for First Degree Curricula[(2)];
(b) enrol in not less than 180 credits of courses, unless otherwise required or permitted under the Regulations;

---

(1) This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

(2) The specific requirements applicable to candidates of this degree curriculum are spelt out in the syllabuses.

(c) follow the required number of compulsory and elective courses as prescribed in the syllabuses of the equivalent of normally 60 credits for each year of study. For each semester, candidates shall select not less than 24 or more than 36 credits of courses, except for the last semester of study;
(d) take a maximum of 84 credits of introductory level courses and the rest being advanced level courses as prescribed in the syllabuses over the entire period of studies; and
(e) take not less than 84 credits of advanced level courses from the Department of Statistics and Actuarial Science.

Selection of courses

AS5 Candidates who wish to withdraw from a course at the beginning of each semester may do so up to 2 weeks after the commencement of the semester. Withdrawal beyond the 2-week deadline will not be permitted, except for medical or other reasons acceptable by the Faculty Board, and candidates' withdrawal from any course without permission will be given a failed grade.

Assessment and grades

AS6 Candidates should be assessed for each of the courses which they have registered. The assessment may take one or a combination of forms as prescribed in the syllabuses and shall normally include the candidates' coursework during the semester. Only those satisfactorily completed courses will earn credits.

AS7 Candidates' performance in a course shall be assessed with the grading system as prescribed in UG5 of the Regulations for First Degree Curricula.

Failure in examination

AS8 Candidates who fail in any course may, as directed by the Board of Examiners, be permitted to present themselves for re-assessment with or without repeating the failed course. The timing and the form(s) of re-assessment shall be decided by the Board of Examiners. Candidates shall not be allowed to repeat a course for which they have achieved a passed grade for upgrading purposes, nor shall they be permitted to repeat a course more than once. The failed grade will be recorded in the official transcripts. The new grade obtained after re-assessment of the same failed course will also be recorded and will replace the previous F grade in the calculation of the weighted grade point averages. As failed courses shall not be credited towards a degree, failed compulsory courses must be re-assessed.

Absence from examination

AS9 Candidates who are unable because of their illness to be present for any written examinations may apply for permission to present themselves for a supplementary examination 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 absence from any examination. Candidates who fail to satisfy the examiners in one or more papers in such a supplementary examination shall be considered under the provisions made in these Regulations for failure at the first attempt at the examination, except that a further supplementary examination shall not be permitted.

Performance assessment

AS10 At the end of each semester, candidates' performance shall be assessed for the purposes of determining

(a) their eligibility for progression to an award of the degree;
(b) their eligibility for the award; or
(c) whether they be required to be discontinued from the programme.

Progression of studies

AS11 Candidates shall be permitted to progress if they have:

(a) not exceeded the maximum period of registration; and
(b) accumulated not less than 30 credits and attained a GPA of 1.00 or above over the first and second semesters; or
(c) accumulated not less than 30 credits and attained a GPA of 1.50 or above over the third and fourth semesters; or
(d) accumulated not less than 30 credits and attained a GPA of 1.50 or above over the fifth and sixth semesters; or
(e) attained a semester GPA of 1.50 or above at the end of each subsequent semester.

Those who have not been able to fulfill the requirements above shall be recommended for discontinuation from the programme under General Regulation G12.

Award of the degree

AS12 To be eligible for the award of the degree of BSc(ActuarSc), candidates shall have:

(a) achieved a weighted GPA of 1.00 or above;
(b) successfully accumulated a minimum of 180 credits; and
(c) satisfied the requirements in UG3 of the Regulations for First Degree Curricula.

Degree classification

AS13 A list shall be published of candidates successful in the examinations for each semester. A list of candidates who have successfully completed all the degree requirements shall be published in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, Pass. The classification of honours shall be determined by the Board of the Faculty at its full discretion by taking the overall performance of candidates and other relevant factors into consideration.

Special arrangements for students who take on 6-month full time internships
(Subject to departmental approval, the same arrangements will apply to those who take on internships of a similar nature.)

In order to let final year students who take on 6-month full time internship to finish their degree with only one more semester of study, the department makes the following special arrangement:

1. Students who take on at least 6 months internships can take STAT2813 to earn 6 credits which can be used to replace any core course.
2. Such students can take STAT3806 and STAT3807 as reading courses if these courses are not available after they come back from internships and before they complete their degree. For the reading courses, the assessment will be based on 80% written report and 20% oral presentation.

3. Such students need not follow the regular programme if some courses are not available for them. However, departmental approval will be required for these students to take any other courses outside the regular programme.

SYLLABUSES FOR THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

These syllabuses apply to students admitted in the academic year 2007-2008.

GENERAL FEATURES

1. Curriculum requirements

Regulations AS1 to AS4 specify the requirements with which candidates have to comply for completion of the BSc(ActuarSc) degree programme. For the fulfillment of Regulation UG3 "Requirements for Graduation", candidates shall complete successfully the language studies courses and the broadening courses as listed below. Furthermore they should obtain a pass in an Information Technology proficiency test, or successfully complete a 3-credit course in Information Technology.

2. Course registration

Course registration will take place before the commencement of each semester. All introductory level courses should be taken in the first or second semester except those specified in the syllabuses. In course registration, candidates should pay special attention to the pre-requisite and co-requisite requirements of courses as specified in the syllabuses. A prerequisite is a course which candidates must have completed in accordance with the conditions stipulated by the Dean via the Head of Department before being permitted to take a course in question. A co-requisite is a course which candidates must take at the same time as the course in question.

3. Coursework and examination ratio

Each 6-credit course with the prefix STAT leads to one written examination paper which will be two hours in length, unless otherwise specified. The final grading will be determined by performance in the examination and assessment of coursework in the ratio of 75:25, unless otherwise stated. For courses with other prefixes, please check with the respective departments about the duration of examination and assessment ratio:

Candidates shall take 60 credits of courses in Year I comprising:

STAT1801.	Probability and statistics: Foundations of actuarial science	(6 credits)
STAT1802.	Financial mathematics	(6 credits)
BUSI1002.	Introduction to accounting	(6 credits)
CSIS1117.	Computer programming I	(6 credits)
MATH1813.	Mathematical methods for actuarial science	(6 credits)
ECON1001.	Introduction to Economics I	(6 credits)
ECON1002.	Introduction to Economics II	(6 credits)
Any 6-credit introductory courses		(6 credits)
CSCI0001.	Practical Chinese language course for science students	(3 credits)
ECEN1801.	Academic English for science students	(3 credits)
6 credits of any broadening courses		(6 credits)

Candidates shall take 60 credits of courses in Year II comprising:

STAT2801. Life contingencies	(6 credits)
STAT2802. Statistical models	(6 credits)
STAT2803. Stochastic models	(6 credits)
STAT2804. Linear models and forecasting	(6 credits)
STAT2808. Derivatives markets	(6 credits)
STAT3801. Advanced life contingencies	(6 credits)
STAT3810. Risk theory	(6 credits)
6 credits of courses selected from List B	(6 credits)
ECEN2802. Advanced English for science students	(3 credits)
Broadening courses:	
Humanities and Social Sciences studies	(3 credits)
Culture and Value Studies *or* any inter-faculty electives course outside BSc(ActuarSc) syllabus	(3 credits)
At least 3 credits of any other broadening course	(3 credits)

Candidates shall take 60 or 66 credits of courses in Year III comprising:

STAT2805. Credibility theory and loss distributions	(6 credits)
STAT2806. Financial economics	(6 credits)
STAT3806. Investment and asset management	(6 credits)
STAT3811. Survival analysis	(6 credits)
STAT3812. Stochastic calculus with financial applications	(6 credits)
STAT3305. Financial data analysis	(6 credits)
12 or 18 credits of courses selected from List C	(12/18 credits)
6 credits of courses selected from List B	(6 credits)
6 credits of inter/intra Faculty courses (advanced level)	(6 credits)

List B:
- BUSI0019. Intermediate accounting I
- BUSI0020. Intermediate accounting II
- ECON2101. Microeconomic theory
- ECON2102. Macroeconomic theory
- ECON2113. Microeconomic analysis
- ECON2114. Macroeconomic analysis
- FINA0102. Financial markets and institutions
- FINA0302. Theories of corporate finance
- MATH2303. Matrix theory and its applications
- MATH2601. Numerical analysis
- STAT2807. Corporate finance for actuarial science
- Any other course approved by the Department of Statistics and Actuarial Science

List C:
- STAT2302. Statistical inference
- STAT2306. Business logistics
- STAT2312. Data mining
- STAT3302. Multivariate data analysis
- STAT3304. Computer-aided statistical modelling
- STAT3306. Selected topics in statistics
- STAT3319. Statistics project
- STAT3802. Advanced contingencies
- STAT3807. Fundamentals of actuarial practice
- STAT3809. Current topics in actuarial science
- STAT3316. Advanced probability
- Any other course approved by the Department of Statistics and Actuarial Science

SYLLABUSES FOR THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

These syllabuses apply to students admitted in the academic year 2006-2007.

GENERAL FEATURES

1. Curriculum requirements

Regulations AS1 to AS4 specify the requirements with which candidates have to comply for completion of the BSc(ActuarSc) degree programme. For the fulfillment of Regulation UG3 "Requirements for Graduation", candidates shall complete successfully the language studies courses and the broadening courses as listed below. Furthermore they should obtain a pass in an Information Technology proficiency test, or successfully complete a 3-credit course in Information Technology.

2. Course registration

Course registration will take place before the commencement of each semester. All introductory level courses should be taken in the first or second semester except those specified in the syllabuses. In course registration, candidates should pay special attention to the pre-requisite and co-requisite requirements of courses as specified in the syllabuses. A prerequisite is a course which candidates must have completed in accordance with the conditions stipulated by the Dean via the Head of Department before being permitted to take a course in question. A co-requisite is a course which candidates must take at the same time as the course in question.

3. Coursework and examination ratio

Each 6-credit course with the prefix STAT leads to one written examination paper which will be two hours in length, unless otherwise specified. The final grading will be determined by performance in the examination and assessment of coursework in the ratio of 75:25, unless otherwise stated. For courses with other prefixes, please check with the respective departments about the duration of examination and assessment ratio:

Candidates shall take 60 credits of courses in Year I comprising:	
STAT1801. Probability and statistics: Foundations of actuarial science	(6 credits)
STAT1802. Financial mathematics	(6 credits)
Any two courses from Business, Economics, and Finance	(12 credits)
BUSI1002. Introduction to accounting	(6 credits)
CSIS1117. Computer programming	(6 credits)
MATH1803. Basic mathematics III	(6 credits)
6 credits of courses selected from List A	(6 credits)
CSCI0001. Practical Chinese language course for science students	(3 credits)
ECEN1801. Academic English for science students	(3 credits)
6 credits of any broadening courses	(6 credits)

Candidates shall take 60 credits of courses in Year II comprising:	
STAT2801. Life contingencies	(6 credits)
STAT2802. Statistical models	(6 credits)
STAT2803. Stochastic models	(6 credits)
STAT2804. Linear models and forecasting	(6 credits)
STAT2808. Derivatives markets	(6 credits)
STAT3801. Advanced life contingencies	(6 credits)
STAT3810. Risk theory	(6 credits)
6 credits of courses selected from List B	(6 credits)

ECEN2802. Advanced English for science students	(3 credits)
Broadening courses:	
Humanities and Social Sciences studies	(3 credits)
Culture and Value Studies *or* any inter-faculty electives course outside BSc(ActuarSc) syllabus	(3 credits)
At least 3 credits of any other broadening course	(3 credits)

Candidates shall take 60 credits of courses in Year III comprising:

STAT2805. Credibility theory and loss distributions	(6 credits)
STAT2806. Financial economics	(6 credits)
STAT3806. Investment and asset management	(6 credits)
STAT3811. Survival analysis	(6 credits)
STAT3812. Stochastic calculus with financial applications	(6 credits)
STAT3305. Financial data analysis	(6 credits)
12 credits of courses selected from List C	(12 credits)
6 credits of courses selected from List B	(6 credits)
6 credits of inter/intra Faculty courses (advanced level)	(6 credits)

List A:
- BIOC1001. Basic biochemistry
- BIOL0128. Biological techniques, instrumentation and data processing
- CHEM1301. Basic inorganic chemistry
- CHEM1406. Basic organic chemistry
- MATH1101. Linear algebra I
- MATH1201. Calculus I
- PHYS1111. Introduction to mechanics
- PHYS1112. Electricity and magnetism
- PHYS1113. Heat, light and waves
- PHYS1114. Modern physics
- POLI1003. Making sense of politics
- PSYC1001. Introduction to psychology
- SOCI1001. Introduction to sociology
- SOCI1003. Introduction to anthropology
- SOWK1001. Introduction to social administration
- SOWK1003. Introduction to social welfare
- Any other course approved by the Department of Statistics and Actuarial Science

List B
- BUSI0019. Intermediate accounting I
- BUSI0020. Intermediate accounting II
- ECON2101. Microeconomic theory
- ECON2102. Macroeconomic theory
- ECON2113. Microeconomic analysis
- ECON2114. Macroeconomic analysis
- FINA0102. Financial markets and institutions
- FINA0302. Theories of corporate finance
- MATH2303. Matrix theory and its applications
- MATH2601. Numerical analysis
- STAT2807. Corporate finance for actuarial science
- Any other course approved by the Department of Statistics and Actuarial Science

List C: STAT2302. Statistical inference
STAT2306. Business logistics
STAT2312. Data mining
STAT3302. Multivariate data analysis
STAT3304. Computer-aided statistical modelling
STAT3306. Selected topics in statistics
STAT3307. Project in statistics
STAT3802. Advanced contingencies
STAT3807. Fundamentals of actuarial practice
STAT3809. Current topics in actuarial science
STAT3316. Advanced probability
Any other course approved by the Department of Statistics and Actuarial Science

---

SYLLABUSES FOR THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

These syllabuses apply to students admitted in the academic year 2005-2006.

GENERAL FEATURES

1. Curriculum requirements

Regulations AS1 to AS4 specify the requirements with which candidates have to comply for completion of the BSc(ActuarSc) degree programme. For the fulfillment of Regulation UG3 "Requirements for Graduation", candidates shall complete successfully the language studies courses and the broadening courses as listed below. Furthermore they should obtain a pass in an Information Technology proficiency test, or successfully complete a 3-credit course in Information Technology.

2. Course registration

Course registration will take place before the commencement of each semester. All introductory level courses should be taken in the first or second semester except those specified in the syllabuses. In course registration, candidates should pay special attention to the pre-requisite and co-requisite requirements of courses as specified in the syllabuses. A prerequisite is a course which candidates must have completed in accordance with the conditions stipulated by the Dean via the Head of Department before being permitted to take a course in question. A co-requisite is a course which candidates must take at the same time as the course in question.

3. Coursework and examination ratio

Each 6-credit course with the prefix STAT leads to one written examination paper which will be two hours in length, unless otherwise specified. The final grading will be determined by performance in the examination and assessment of coursework in the ratio of 75:25, unless otherwise stated. For courses with other prefixes, please check with the respective departments about the duration of examination and assessment ratio:

Candidates shall take 60 credits of courses in Year I comprising:

STAT1801.	Probability and statistics: Foundations of actuarial science	(6 credits)
STAT1802.	Financial mathematics	(6 credits)
Any two courses from Business, Economics, and Finance		(12 credits)
BUSI1002.	Introduction to accounting	(6 credits)
CSIS1117.	Computer programming	(6 credits)
MATH1803.	Basic mathematics III	(6 credits)

6 credits of courses selected from List A	(6 credits)
CSCI0001. Practical Chinese language course for science students	(3 credits)
ECEN1801. Academic English for science students	(3 credits)
6 credits of any broadening courses	(6 credits)

Candidates shall take 60 credits of courses in Year II comprising:

STAT2801. Life contingencies	(6 credits)
STAT2802. Statistical models	(6 credits)
STAT2803. Stochastic models	(6 credits)
STAT2804. Linear models and forecasting	(6 credits)
STAT2808. Derivatives markets	(6 credits)
STAT3801. Advanced life contingencies	(6 credits)
STAT3810. Risk theory	(6 credits)
6 credits of courses selected from List B	(6 credits)
ECEN2802. Advanced English for science students	(3 credits)
Broadening courses:	
Humanities and Social Sciences studies	(3 credits)
Culture and Value Studies *or* any inter-faculty electives course outside BSc(ActuarSc) syllabus	(3 credits)
At least 3 credits of any other broadening course	(3 credits)

Candidates shall take 60 credits of courses in Year III comprising:

STAT2805. Credibility theory and loss distributions	(6 credits)
STAT2806. Financial economics	(6 credits)
STAT3806. Investment and asset management	(6 credits)
STAT3811. Survival analysis	(6 credits)
STAT3812. Stochastic calculus with financial applications	(6 credits)
STAT3305. Financial data analysis	(6 credits)
12 credits of courses selected from List C	(12 credits)
6 credits of courses selected from List B	(6 credits)
6 credits of inter/intra Faculty courses (advanced level)	(6 credits)

List A:
- BIOC1001. Basic biochemistry
- BIOL1104. Biological techniques, instrumentation and data processing
- CHEM1301. Basic inorganic chemistry
- CHEM1406. Basic organic chemistry
- MATH1101. Linear algebra I
- MATH1201. Calculus I
- MATH1800. Elements of discrete mathematics
- PHYS1111. Introduction to mechanics
- PHYS1112. Electricity and magnetism
- PHYS1113. Heat, light and waves
- PHYS1314. Modern physics
- POLI1003. Making sense of politics
- PSYC1001. Introduction to psychology
- SOCI1001. Introduction to sociology
- SOCI1003. Introduction to anthropology
- SOWK1001. Introduction to social administration
- SOWK1003. Introduction to social welfare
- Any other course approved by the Department of Statistics and Actuarial Science

List B: BUSI0019. Intermediate accounting I
BUSI0020. Intermediate accounting II
ECON2101. Microeconomic theory
ECON2102. Macroeconomic theory
ECON2113. Microeconomic analysis
ECON2114. Macroeconomic analysis
FINA0102. Financial markets and institutions
FINA0302. Corporate finance
MATH2303. Matrix theory and its applications
MATH2601. Numerical analysis
STAT2807. Corporate finance for actuarial science
Any other course approved by the Department of Statistics and Actuarial Science

List C STAT2302. Statistical inference
STAT2306. Business logistics
STAT2312. Data mining
STAT3302. Multivariate data analysis
STAT3304. Computer-aided statistical modelling
STAT3306. Selected topics in statistics
STAT3307. Project in statistics
STAT3802. Advanced contingencies
STAT3807. Fundamentals of actuarial practice
STAT3809. Current topics in actuarial science
STAT3316. Advanced probability
Any other course approved by the Department of Statistics and Actuarial Science

---

SYLLABUSES FOR THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

These syllabuses apply to students admitted in the academic years 2004-2005.

GENERAL FEATURES

1. Curriculum requirements

Regulations AS1 to AS4 specify the requirements with which candidates have to comply for completion of the BSc(ActuarSc) degree programme. For the fulfillment of Regulation UG3 "Requirements for Graduation", candidates shall complete successfully the language studies courses and the broadening courses as listed below. Furthermore they should obtain a pass in an Information Technology proficiency test, or successfully complete a 3-credit course in Information Technology.

2. Course registration

Course registration will take place before the commencement of each semester. All junior-level courses should be taken in the first or second semester except those specified in the syllabuses. In course registration, candidates should pay special attention to the pre-requisite and co-requisite requirements of courses as specified in the syllabuses. A prerequisite is a course which candidates must have completed in accordance with the conditions stipulated by the Head of Department before being permitted to take a course in question. A co-requisite is a course which candidates must take at the same time as the course in question.

3. Coursework and examination ratio

Each 6-credit course leads to one written examination paper which will be two hours in length, unless otherwise specified. The final grading will be determined by performance in the examination and assessment of coursework in the ratio of 75:25, unless otherwise stated. For courses offered by the Schools of Business and Economics and Finance, the assessment ratio will be announced by teachers at the beginning of each semester.

Candidates shall take 60 credits of courses in semesters I and II comprising:

STAT1801. Probability and statistics: Foundations of actuarial science	(6 credits)
STAT1802. Financial mathematics	(6 credits)
Any two courses from Business, Economics, and Finance (with BUSI0016, being equivalent to FINA1002, considered as an introductory level Finance course)	(12 credits)
BUSI1002. Introduction to accounting	(6 credits)
CSIS0911. Computer concepts and programming	(6 credits)
MATH1803. Basic mathematics III	(6 credits)
6 credits of courses selected from List A	(6 credits)
CSSC1001. Practical Chinese language course for social sciences students	(3 credits)
ECEN1801. Academic English for social sciences students	(3 credits)
6 credits of any broadening courses	(6 credits)

Candidates shall take 60 credits of courses in semesters III and IV comprising:

STAT2801. Life contingencies	(6 credits)
STAT2802. Statistical models	(6 credits)
STAT2803. Stochastic models	(6 credits)
STAT2804. Linear models and forecasting	(6 credits)
STAT3801. Advanced life contingencies	(6 credits)
STAT3810. Risk theory	(6 credits)
12 credits of courses selected from List B	(12 credits)
ECEN2802. Advanced English for science students	(3 credits)
Broadening courses:	
Humanities and Social Sciences studies	(3 credits)
Culture and Value Studies *or* any inter-faculty electives course outside BSc(ActuarSc) syllabus	(3 credits)
At least 3 credits of any other broadening course	(3 credits)

Candidates shall take 60 credits of courses in semesters V and VI comprising:

STAT2805 Credibility theory and loss distributions	(6 credits)
STAT2806. Financial economics	(6 credits)
STAT3806. Investment and asset management	(6 credits)
STAT3811. Survival analysis	(6 credits)
STAT3812. Stochastic calculus with financial applications	(6 credits)
STAT3305. Financial data analysis	(6 credits)
12 credits of courses selected from List C	(12 credits)
12 credits of inter/intra Faculty courses (advanced/senior-level)	(12 credits)

List A:
- BIOC1001. Basic biochemistry
- BIOL1104. Biological techniques, instrumentation and data processing
- CHEM1301. Basic inorganic chemistry
- CHEM1406. Basic organic chemistry
- MATH1101. Linear algebra I
- PHYS1111. Introduction to mechanics

PHYS1112. Electricity and magnetism
PHYS1113. Heat, light and waves
POLI1002. Fundamentals of public administration
POLI1003. Making sense of politics
PSYC1001. Introduction to psychology
PSYC1002. How the mind works: Explorations in basic thinking processes
PSYC1003. Psychology and life: Personality and social influence
SOCI1001. Introduction to sociology
SOCI1002. Discovering society
SOCI1003. Introduction to anthropology
SOWK1001. Introduction to social administration
SOWK1003. Introduction to social welfare
Any other course approved by the Department of Statistics and Actuarial Science

List B: BUSI0011. Corporate finance
BUSI0017. Financial markets and institutions
BUSI0019. Intermediate accounting I
BUSI0020. Intermediate accounting II
ECON2101. Microeconomic theory
ECON2102. Macroeconomic theory
ECON2113. Microeconomic analysis
ECON2114. Macroeconomic analysis
FINA0102. Financial markets and institutions
FINA0302. Corporate finance
MATH2303. Matrix theory and its applications
MATH2601. Numerical analysis
STAT2807. Corporate finance for actuarial science
Any other course approved by the Department of Statistics and Actuarial Science

List C: STAT2306. Business logistics
STAT2312. Data mining
STAT3302. Multivariate data analysis
STAT3304. Computer-aided statistical modelling
STAT3306. Selected topics in statistics
STAT3307. Project in statistics
STAT3308. Financial engineering
STAT3802. Advanced contingencies
STAT3807. Fundamentals of actuarial practice
STAT3809. Current topics in actuarial science
Any other course approved by the Department of Statistics and Actuarial Science

---

BIOC1001. Basic biochemistry (6 credits)

This course is designed to present an overview of biochemistry and to provide an understanding of the basic mechanisms underlying life processes. It is an independent course which can be taken by students from various disciplines. The course also prepares students for further studies in Biochemistry and Molecular Biology.
Prerequisite: AS Biology or AS Chemistry

BIOL0128. Biological techniques, instrumentation and data processing (6 credits)

This course is designed to provide students with a wide range of basic biological techniques, principles of instruments and data processing. Basic concepts in protein/DNA purification including precautions, detection and verification of purified products are included. The course is also opened to those who wish to take a major or a minor in Biology for General Science.
Prerequisite: HKCEE Biology or equivalent

BUSI1002. Introduction to accounting (6 credits)

The course will cover the principles of double entry book-keeping, the interpretation of financial statements, the issues raised by corporate regulation, and the use of management information for decision making.

BUSI0019. Intermediate accounting I (6 credits)

The course provides an in-depth knowledge of the first part of financial accounting. It covers the environment of financial accounting and the development of accounting standards; conceptual framework underlying financial accounting; statement of income and retained earnings; balance sheet; accounting and the time value of money; cash and receivables; valuation of inventories; acquisition and disposition of property, plant and equipment; depreciation and depletion; intangible assets; current liabilities and contingencies; long-term liabilities; temporary investments and long-term investments; and revenue recognition.
Prerequisite: BUSI1002. Introduction to accounting

BUSI0020. Intermediate accounting II (6 credits)

This course provides an in-depth knowledge of the second part of financial accounting. It covers stockholders' equity; dilutive securities and earnings per share calculations; accounting for income taxes; accounting for pensions and postretirement benefits; accounting for leases; accounting changes and error analysis; statements of cash flows; basic financial statement analysis; and full disclosure in financial reporting.
Prerequisite: BUSI0019. Intermediate accounting I

CHEM1406. Basic organic chemistry (6 credits)

To educate the student in the terminology, methodology and problem solving skills appropriate to the study of carbon based molecules in both their academic and practical applications. This course is a pre-requisite for CHEM2402, Intermediate Organic Chemistry.
Prerequisite: AL or AS Chemistry
Co-requisite: CHEM2510 is preferred

CSCI0001. Practical Chinese language course for science students (3 credits)

(1) Practical Chinese Writing Skills
    (a) Classical and modern Chinese
    (b) The Chinese language: characteristics and usage
    (c) Basic grammar of modern Chinese

(2) Chinese Characters
  (a) Traditional characters
  (b) Simplified characters
  (c) Variant forms
(3) Letter-writing
  (a) Business letter writing techniques
  (b) Official letter writing techniques
(4) Office Documents
  (a) Notices and announcements
  (b) Proposals
  (c) Minutes and reports of meetings
(5) Chinese for Special Purposes
  (a) An introduction to science and technology in ancient China
  (b) Reader-based scientific/technical writings
  (c) Styles and rhetoric of scientific/technical writings
(6) Presentation and Communication Techniques
  (a) Communication and presentation techniques
  (b) Discussion and the art of persuasion

CSIS1117. Computer programming I (6 credits)

The goal of this course is for students to learn the general principles of programming, including how to design, implement, document, test, and debug programs.
Assessment: 50% coursework; 50% examination.

ECEN1801. Academic English for science students (3 credits)

To build confidence in the use of English for writing and speaking about science. 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 organized and coherent manner.

ECEN2802. Advanced English for science students (3 credits)

To develop a sense of audience awareness in writing, to develop spontaneous speaking skills and to individualise language learning. 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.

Prerequisite: ECEN1801

ECON1001. Introduction to Economics I (6 credits)

An introduction to the basic concepts and principles of microeconomics – the study of demand and supply, consumer theory, cost and production, market structure, and resource allocation efficiency.

ECON1002. Introduction to Economics II (6 credists)

This course is an introduction to macroeconomics – the study of business cycle fluctuations and long run economic growth. Topics include the measurement of national economic performance; the problems of recession, unemployment, and inflation; money supply, government spending, and taxation; fiscal and monetary policies for full employment and price stability; the determination of the exchange rate; and international trade and payments.

ECON2101. Microeconomic theory (6 credits)

The laws of demand, supply, returns, and costs; price and output determination in different market situations; theory of factor pricing and income distribution; general equilibrium; interest and capital.
Prerequisite: ECON1001 Introduction to Economics I
Remarks: Not open to students taking or having taken ECON2113 Microeconomic analysis.

ECON2102. Macroeconomic theory (6 credits)

Theories of income, employment, and the price level; analysis of secular growth and business fluctuations; introduction to monetary and fiscal policy.
Prerequisite: ECON1001 Introduction to Economics I
Remarks: Not open to students taking or having taken ECON2114 Macroeconomic analysis.

ECON2113. Microeconomic analysis (6 credits)

Examine microeconomic issues with applications. Topics include: consumer behaviour, cost structure, market structure, theory of the firm, factor market and general equilibrium.
Prerequisite: ECON1001 Introduction to Economics I
Remarks: Open only to non-BEcon, non-BFin and non-BEcon&Fin students; candidates who have taken ECON2101 Microeconomic theory are not allowed to take this course.

ECON2114. Macroeconomic analysis (6 credits)

Economics of inflation, unemployment, income and output determination in the short run and the long run. Money, interest rates and exchange rates. Macroeconomic stabilization policies and open economy macroeconomic issues.
Prerequisite: ECON1001 Introduction to Economics I
Remarks: Open only to non-BEcon, non-BFin and non-BEcon&Fin students; candidates who have taken ECON2102 Macroeconomic theory are not allowed to take this course.

FINA0102. Financial markets and institutions (6 credits)

This course is designed to introduce and analyze the structure, operations and functions of the financial system. The course starts with an introduction to financial markets' role in the economy, and the determination of interest rates and valuation of cash flows. The course then discusses various financial markets including money markets, bond markets, mortgage markets, stock markets and derivatives markets. Financial institutions will be discussed with an emphasis on their major functions and operations.
Prerequisite: ECON1001 Introduction to Economics I and FINA1003 Corporate finance

FINA0302. Theories of corporate finance (6 credits)

A course on the advanced treatment of corporate financial decisions. Topics to be covered include corporate valuation; cost of capital; capital structure; leasing; mergers and acquisitions; options; warrants; and convertible bonds.
Prerequisite: ECON1001 Introduction to Economics I and BUSI0016/FINA1002 Introduction to finance or FINA1003 Corporate finance

---

MATH1001 Fundamental concepts of mathematics * (6 credits)

To provide students with solid background on fundamental concepts of mathematics and methods of mathematical proofs. Such fundamental 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.
Prerequisite: HKCEE Additional Mathematics or AS Mathematics and Statistics or equivalent. Students with good grades in HKCEE Mathematics and have strong interests in mathematics may also apply.
* *Students having passed MATH1101 and MATH1201 are not allowed to take this course.*

MATH1813. Mathematical methods for actuarial science * (6 credits)

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. Contents include: 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.
Prerequisite: AL Pure Mathematics or equivalent. Students taking or having passed in MATH1803 or MATH1211 or MATH1805 are not allowed to take this course.
* *Students having passed MATH1202 and MATH1803 are not allowed to take this course.*

MATH2303. Matrix theory and its applications (6 credits)

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 will be used in the course, so that students can learn how to use the computer to solve matrix problems.
Prerequisite: 1) (MATH1101 and MATH1102); or 2) (MATH1811/MATH1812 or MATH1803); or 3) (MATH1801/MATH1802 or MATH1807)

MATH2601. Numerical analysis (6 credits)

This course covers both the theoretical and practical aspects of Numerical Analysis. Emphasis will be on basic principles and practical methods of solution, using high speed computers.
Prerequisite: 1) (Two out of MATH1101, MATH1102, MATH1201, MATH1202, one of which should be MATH1201 or MATH1202) or (MATH1811/MATH1812 or MATH1803) or (MATH1801/MATH1802 or MATH1807); and 2) Knowledge of a programming language

Unless otherwise specified by the Department of Politics and Public Administration, the final grading for each course will be determined by performance in the examination and assessment of coursework in a ratio to be announced by individual course instructors at the beginning of each semester. The weighting of examination ranges from 40-60% of total course assessment.

POLI1003. Making sense of politics (6 credits)

It is an introductory course offered to students with no previous background in political science. It covers the basic concepts, institutions and processes that one would encounter in the study of politics. Emphasis will be placed on the application of concepts to current issues, including (but not restricted to) that of Hong Kong.

PSYC1001. Introduction to psychology (6 credits)

Discussion of basic concepts in psychology and a preliminary survey of representative work carried out in various areas of psychological investigation, together with an investigation at some length of one such area.

Eligibility: Students taking or having taken PSYC1002 or PSYC1003 are not allowed to take this course.

SOCI1001. Introduction to sociology (6 credits)

This course introduces students to the nature of sociological enquiry and the basic concepts used in sociological analysis. After some reference to the influence of inheritance and environment on human social behaviour, the course will focus on key concepts used in the analysis of cultures, social structures, social processes and social change. The relationship between research, concepts and contemporary theory will be explored at an introductory level.

SOCI1003. Introduction to anthropology (6 credits)

This course will explore, through cross-cultural comparison, key social and cultural issues, such as marriage and the family, caste and class, ethnicity and identity, language and culture, state formation, economic value, gender and religion. The course will draw on studies of the peoples and cultures of Asia.

SOWK1001. Introduction to social administration (6 credits)

This is a basic course in the understanding of social policy in the areas of human resources planning and education, land use and housing, ageing and social security, family and support services, etc.

SOWK1003. Introduction to social welfare (6 credits)

This course introduces the basic concepts and function of social welfare. Analysis will be undertaken of the range and variety of social services in Hong Kong including family services, youth centres, outreaching services, school social work, community development, rehabilitation, elderly services, probation and correctional services.

STAT1304. The analysis of sample surveys (6 credits)

We often try to infer the characteristics of a population by taking a sample from that population. The validity and the efficiency of the findings depend on the quality of the sample. This course considers the basic theory and practical applications for the different sampling design and analysis. Examples on marketing surveys, social surveys and opinion polls will be considered.

Prerequisite: HKCEE Mathematics or AS-level Mathematics & Statistics or A-level Pure Mathematics or equivalent AND taking or having taken STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1801 or ECON1003 or ECOL2006 or STAT1000 or STAT1003 or STAT1007 or STAT0601 or STAT1001 or STAT1006 or STAT1008 or STAT2001 or STAT0602

STAT1801. Probability and statistics: foundations of actuarial science (6 credits)

This course provides the basic foundations in probability and statistics for students in B.Sc.(ActuarSc), though the course is also suitable for mathematically-able students from other quantitative curricula. Probability theory underpins the study of statistics. The course aims firstly to develop skills in probabilistic analysis for problems involving randomness. Random variables and probability distributions are studied in depth, such as discrete and continuous distributions, conditional probability, conditional expectation, central limit theorem. The concepts of statistics are then introduced, guided by motivating examples.

Prerequisite: A-Level Pure Mathematics or AS-level Mathematics & Statistics or equivalent. (Students taking or having taken STAT0301 or STAT0302 or STAT1301 or STAT1306 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT0601 or STAT0602 are not allowed to take this course.)

STAT1802. Financial mathematics (6 credits)

This course introduces the mathematics of finance which plays an important role in the development of basic actuarial techniques. Introduction to risk management and practical applications of the actuarial functions are also covered. 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, short sales and modern financial instruments; stochastic approaches to interest; financial derivatives including forwards, futures, options and swaps; insurance, collars and other strategies; introduction to risk management.

Examination: One three-hour written paper.

Prerequisite: A-level Pure Mathematics or AS-level Mathematics & Statistics or equivalent AND taking or having taken STAT1801 or STAT1302.

STAT2302. Statistical inference (6 credits)

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. Contents include: (1) Decision theory: loss function; risk; decision rule; admissibility; minimaxity; unbiasedness; Bayes' rule; (2) Estimation theory: group families; exponential families; likelihood; sufficiency; minimal sufficiency; ancillarity; completeness; UMVU estimators; information inequality; large-sample theory of maximum likelihood estimation; (3) 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; Wald's test; score test.

Prerequisite: STAT1302 or STAT2802

STAT2305. Quality control and management (6 credits)

The successful control of quality in production is a matter of primary importance to a company's profitability and good-will. 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 sampling plans, sequential sampling procedures, analysis of measurement errors, reliability, and life-testing. Contemporary quality management systems such as total quality control, quality control circle, 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. Contents include: Probability distributions and their application, 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. Management of quality control, total quality control, zero defects, six-sigma, and ISO-9000.

Prerequisite: STAT1301 or STAT1306 or STAT0301 or STAT1801 or STAT0302 or ECON1003 or ECOL2006 or STAT0100 or STAT2802 or STAT0604 or STAT0605

STAT2306. Business logistics (6 credits)

Originally, the word 'logistics' described the strategic aspects involved in moving and supplying armies and navies. Usage grew to include games of strategy, such as chess. Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportation or in deciding a location for a new factory. This course addresses the business applications of logistics. Contents include: optimization techniques applied to problems in the allocation of resources, financial planning and transportation; linear programming, dynamic programming, integer programming; network analysis, critical path methods; queuing theory; probability modelling tools in production and inventory control.

Prerequisite: STAT1301 or STAT1306 or STAT0301 or STAT0302 or STAT1801 or ECON1003 or ECOL2006 or STAT1000 or STAT1001 or STAT1003 or STAT1006 or STAT1007 or STAT1008 or STAT2001 or STAT0601 or STAT0602. (Students taking or having taken MATH2901 are not allowed to take this course.)

STAT2312. Data mining (6 credits)

With an explosion in information technology in the past decade, vast amounts of data appear in a variety of fields such as finance, marketing research, customer relations management, medicine and healthcare. 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. Contents include: data pre-processing, association rules, classification and regression trees, neural networks, and cluster analysis.

Assessment: 100% coursework.

Prerequisite: STAT1801 or STAT1301 or STAT1306 or STAT0301 or STAT0302 or ECON1003 or ECOL2006 or STAT1000 or STAT1007 or STAT0601 or STAT0602 or STAT1001 or STAT1003 or STAT1006 or STAT1008 or STAT2001

STAT2801. Life contingencies (6 credits)

The major objectives of this course are to integrate life contingencies into a full probabilistic framework and to demonstrate the wide variety of constructs which are then possible to build from basic models at the foundation of actuarial science. The time-until-death random variable will be the basic building block by which models for life insurances, designed to reduce the financial impact of

the random event of untimely death, will be developed. Techniques for calculation benefit premiums and benefit reserves of various types of life annuity and insurance will be discussed.
Examination: One three-hour written paper.
Prerequisite: (STAT1302 and STAT2315) or (STAT1802 and taking or having taken STAT2802) or (STAT1302 and STAT1802) or (STAT0100 and STAT0113)

STAT2802. Statistical models (6 credits)

This course builds on STAT1801, introducing further the concepts and methods of statistics. 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. Contents include: Random Variables and Probability Distributions; Function of Random Variables; Sampling Distributions; Limiting Distributions; Estimation Theory; Confidence Intervals; Analysis of variance and application; Hypothesis Testing; Goodness of Fit Test.
Examination: One three-hour written paper.
Prerequisite: STAT1801

STAT2803. Stochastic models (6 credits)

This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed. Main topics include introduction to probability theory, Conditional probability and expectation, Markov chains, random walk models, Poisson process, Brownian Motion. Birth-and-death process, branching process and renewal process may also be covered (if time permits).
Examination: One three-hour written paper.
Prerequisite: STAT1801. (Students taking or having taken STAT2303 or MATH2603 are not allowed to take this course.)

STAT2804. Linear models and forecasting (6 credits)

This course deals with applied statistical methods of linear models and investigates various forecasting procedures through time series analysis. Contents include: regression and multiple linear regression; predicting; generalised linear model; time series models including autoregressive, moving average, autoregressive-moving average and integrated models; forecasting.
Examination: One three-hour written paper.
Prerequisite: STAT1302 or (students taking or having taken STAT2802) or STAT0100 or STAT0605 (Students taking or having taken STAT2301 or STAT3301 or STAT0102 or SAT0604 or STAT3101 are not allowed to take this course.)

STAT2805. Credibility theory and loss distributions (6 credits)

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. Topics on credibility include: Limited fluctuation approach, Bühlmann's approach, Bayesian approach, and their applications. Topics on loss distribution will be: Some often used distributions for loss and properties, truncation and modification, compound distributions, and mixed models. At the end of the course, we will cover some topics which are used in the option pricing theory, such as lognormal distribution, estimating the parameters of a lognormal distribution, Monte Carlo method and applications to option valuation.
Examination: One three-hour written paper.
Prerequisite: STAT1302 or STAT2802 or STAT3810 or STAT0100 or STAT0604 or STAT0605 or STAT0802

STAT2806. Financial economics (6 credits)

This course covers the skills necessary to construct and apply discrete stochastic models to value financial derivatives. Contents include: introduction to financial market, probability space, random variable, conditional expectation, discrete time stochastic process and martingales, discrete time asset pricing models and valuation of derivative securities. Basic ideas of asset and liability management, interest rate risk and immunization.
Examination: One three-hour written paper.
Prerequisite: STAT1302 or STAT2802 or STAT0100 or STAT0604 or STAT0605

STAT2807. Corporate finance for actuarial science (6 credits)

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. 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.
Examination: One three-hour written paper.
Prerequisite: (BUSI1002 and STAT1802) or (STAT2310 and STAT2315)

STAT2808. Derivatives Markets (6 credits)

This course aims at demonstrating the practical use of financial derivative products to analyse various problems arisen in financial engineering. Emphases are on the various option pricing formulae, hedging techniques and interest rate models. Contents include: Review of futures, forwards and options and the concept of no arbitrage; put-call parity; valuation of European and American options using the binomial 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; diffusion process and Ito's formula; interest rate models: bond options, caps and the Black model, market making and bond pricing, the Vasicek and Cox-Ingersoll-Ross bond price models, the binomial interest rate model and the Black-Derman-Toy model.
Prerequisite: STAT1802

STAT2813. Internship in Actuarial Science (6 credits)

This course is offered to actuarial science students who take on an 6-month full time or similar internships. A student can complete this course as a project based his/her internship. 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 his/her internship.
Examination: 80% written report and 20% oral presentation. The student needs to present a certificate from the employer which indicates that the report is about his/her project during the internship period.
Prerequisite: STAT1802 or STAT2801

STAT3302. Multivariate data analysis (6 credits)

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. Contents include: Problems with multivariate data. Multivariate normality and transforms. Correlations: Simple, partial, multiple and canonical. Principal components analysis. Factor analysis. Mean structure for one sample. Problems for means of several samples. Multivariate analysis of variance. Discriminant analysis. Classification. Multivariate multiple regression. Clustering algorithms.
Assessment: 50% coursework, 50% examination.
Examination: One three-hour written paper.
Prerequisite: STAT2301 or STAT2804 or STAT0102 or STAT0801 or STAT0604

STAT3304. Computer-aided statistical modelling (6 credits)

This is a computer-aided course of statistical modelling designed for the students who have taken STAT2301 Linear Statistical Analysis and like to see theory illustrated by practical computation. Numerous real data sets will be presented for modelling and analysis using statistical software, such as SAS, for gaining hands-on experience. The course also aims to develop skills of model selection and hypotheses formulation for testing, 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. Modern computer software such as SAS makes this interactive approach easier.
Assessment: 50% coursework, 50% examination.
Examination: One three-hour written paper.
Prerequisite: STAT2301 or STAT2804 or STAT0102 or STAT0801 (Students taking or having taken STAT3601 or STAT2311 are not allowed to take this course.)

STAT3305. Financial data analysis (6 credits)

This course focuses on understanding financial data and methods by which they are analyzed and interpreted. It aims at enhancing the students' analytical skills of developing statistical models for analysing financial data. Techniques are motivated by examples and developed in the context of applications. Students will learn how to process financial data for purposes of financial analysis, estimation and testing of financial models and to understand better crucial aspects of financial market movements. Contents include: modelling non-normal return; financial time series models including ARCH models and generalisation, and threshold models; forecasting volatility and correlation; Monte Carlo Simulation and option pricing; Estimation of value at risk and expected tail loss; becktesting and stress testing.
Assessment: 40% coursework, 60% examination.
Prerequisite: STAT2309 or (students taking or having taken STAT2806) or ECON1001

STAT3306. Selected topics in statistics (6 credits)

This course introduces basic 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.
Prerequisite: STAT2301 or STAT2804 or STAT0102 or STAT0801 or STAT0604

STAT3307. Project in statistics (6 credits)

Each year a few projects suitable for Statistics or Actuarial Science major students will be offered. These projects, under the supervision of individual staff members involve the application of statistics and/or probability in interesting situations. They provide students with practical experience in approaching a real problem, in report writing and in oral presentation.
Assessment: 80% written report, 20% oral presentation.
Prerequisite: STAT2301 or (STAT2802 and STAT2804) or STAT0102 or STAT0604 or (STAT2802 and STAT0801) Approval is subject to past academic performance. Availability of this course to Actuarial Science students is also subject to a quota.

STAT3308. Financial engineering (6 credits)

This course aims at demonstrating the practical use of financial derivative products to analyse various problems arisen in financial engineering. Emphases are on the various option pricing formulae, hedging techniques and interest rate models. Contents include: Review of futures, forwards and options and the concept of no arbitrage; put-call parity; valuation of European and American options using the binomial 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; diffusion process and Ito's formula; interest rate models: bond options, caps and the Black model, market making and bond pricing, the Vasicek and Cox-Ingersoll-Ross bond price models, the binomial interest rate model and the Black-Derman-Toy model.
Prerequisite: 1. STAT2309 or (students taking or having taken STAT2806) or STAT0109 or STAT0806 (for students admitted in 2004-05 or before)
2. STAT2315 (for students admitted in 2005-06 or thereafter)

STAT3316. Advanced probability (6 credits)

This course provides an introduction to measure theory and probability. The course will focus on some basic concepts in probability which are essential for students to read research papers in actuarial science, probability and statistics. Contents include: Kolmogorov-Borel probability spaces, σ-field, measurability, random variable, integration, theory of expectation, probabilistic inequalities, L^p- and Hilbert spaces, conditional expectations, limit theorems, martingales and applications.
Prerequisite: STAT2303 or STAT2803 or similar level courses in probability theory.

STAT3319. Statistics project * (12 credits)

Each year a few projects suitable for Statistics or Actuarial Science major students will be offered. These projects, under the supervision of individual staff members involve the application of statistics and/or probability in interesting situations. They provide students with practical experience in approaching a real problem, in report writing and in oral presentation.
Assessment: 80% written report, 20% oral presentation.
Prerequisite: STAT2301 or (STAT2802 and STAT2804) or STAT0102 or STAT0604 or (STAT2802 and STAT0801). Approval is subject to past academic performance. Availability of this course to Actuarial Science students is also subject to a quota.

* *Offered from 2009-2010. For students admitted in 2007-2008 or thereafter only.*

STAT3801. Advanced life contingencies (6 credits)

This course builds on the material covered in STAT2801. Several extensions of the basic theory of life contingencies and insurance models are discussed. The analysis of financial benefits contingent on the time of death of a single life can be extended to benefits involving several lives. The multiple decrement models, instead of a single contingency of death, are studied. Applications of these advanced theories are given. Contents include: select and ultimate tables; multiple life functions; multiple decrement models; valuation for pension plans; nonforfeiture benefits and dividends including surrender values and paid-up insurance; gross premiums; gross premium reserves; alterations to life insurance policies.
Examination: One three-hour written paper
Prerequisite: Students taking or having taken STAT2801

STAT3802. Advanced contingencies (6 credits)

This course serves as a continuation of STAT3801 and extends the coverage of statistical models and actuarial techniques used in the field of life insurance. 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; cost of guarantees and options; applications of actuarial techniques to a wide range of insurance problems.
Examination: One three-hour written paper
Prerequisite: STAT3801

STAT3806. Investment and asset management (6 credits)

This course provides basic analysis of various investment instruments and asset management techniques. Emphasis will be placed on methods to tackle problems faced by insurance industry such as interest rate fluctuations. This course covers the following topics: introduction to financial markets, the structure of interest rates, cash-flow matching methods and immunization models.
Prerequisite: STAT3801 or (STAT2802, for students admitted in or before the academic year 2003-2004)

STAT3807. Fundamentals of actuarial practice (6 credits)

This course covers basic principles of design, risk classification, pricing/ratemaking/funding, profit/surplus analysis, and valuation of financial security programmes including life, health, retirement plans, and property casualty insurance.
Prerequisite: STAT3801

STAT3809. Current topics in actuarial science (6 credits)

This course covers a range of topics related to professional actuarial work which may include topics from regulatory requirements, law, life, health, financial planning, property and casualty and reinsurance.
Prerequisite: STAT3801 or (STAT2802, for students admitted in or before the academic year 2003-2004)

STAT3810. Risk theory (6 credits)

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, policy modifications, ruin probability, etc.
The general scope of the course content is as follows: Preliminaries; individual risk models; collective risk models; ruin theory; concepts of decision theory and application; fundamental concepts of rating and application to simple experience rating systems; techniques for analyzing a delay (or run-off) triangle and projecting the ultimate position.
Examination: One three-hour written paper.
Prerequisite: (Taking or having taken STAT2803) or STAT2303 or MATH2603 or STAT0103

STAT3811. Survival analysis (6 credits)

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. This course covers: the nature and properties of survival models, including both parametric and tabular models. Topics will be selected from: methods of estimating tabular models from both complete and incomplete data samples, including the actuarial, moment, and maximum likelihood estimation techniques; methods of estimation parametric models from both complete and incomplete data samples, including parametric models with concomitant variables; evaluation of estimators from sample data; valuation schedule exposure formulas; practical issues in survival model estimation; statistical models including binomial and Poisson models; practical methods of estimating age specific single decrement rates; analysis of age and duration; practical considerations in life-office data collection, monitoring actual experience against that expected.
Examination: One three-hour written paper
Prerequisite: (Taking or having taken STAT2802) or STAT2301 or STAT2801 or STAT0102 or STAT0604 or STAT0801

STAT3812. Stochastic calculus with financial applications (6 credits)

Stochastic calculus has become an essential tool in economics, insurance, finance and econometrics. This mathematical theory is the basis for pricing financial derivatives such as options and futures. This course is designed for students to develop professional skills in stochastic calculus and its applications to actuarial science and finance. Pure mathematical components of the course will be kept at a reasonably low level. The course begins with an overview of the basic concepts from probability theory. Stochastic processes, especially Brownian motion and martingales will be discussed. The main topics of the course include: Ito's stochastic integral, Ito's formula and stochastic differential equations. After developing the theory of stochastic calculus, Black-Scholes option pricing formula will be derived. Interest rate models, such as, Vasicek and Cox-Ingersoll-Ross models will be studied,
Prerequisite: STAT2303 or STAT2803 or MATH2603 or STAT0103