BSc in Actuarial Science

Syllabuses and Regulations (4-year curriculum)

2016-17

Faculty of Science
The University of Hong Kong
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Degree : Bachelor of Science in Actuarial Science

Objectives: The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

Learning Outcomes of Actuarial Science Programme

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

(1) understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(2) understand and identify the nature of insurance, finance and investment risks
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(3) develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(4) formulate effective business strategies to manage various kinds of risk
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(5) communicate and collaborate with people effectively on issues related to actuarial science
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(6) discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses
   (by means of coursework and tutorial classes and/or research-based project in the curriculum)
1. General guideline for contact hours requirement in the BSc (Actuarial Science) Degree Curriculum

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

2. Credit Unit Statement of the BSc (Actuarial Science) Degree Curriculum

The BSc(Actuarial Science) degree curriculum consists of five major types of courses based on the learning activities. The courses in the curriculum are 6 credits. Examples of the contact hours requirements for the five categories of courses are described as follows.

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

(b) Lecture with laboratory component courses (6 credits)
Contact hours for 6-credit course: 24 hours of lectures, 24 hours of laboratory and 6 hours of tutorial
These courses are taught by a combination of lectures and laboratory/practical sessions. Assessment is by a combination of examination (0-70%) and continuous assessment (30-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays, laboratory reports, and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

(c) Laboratory and Workshop courses (6 credits)
Contact hours: 48 hours of laboratory or workshop and 12 hours of tutorial
These courses aim at enriching the student's research skills and encourage group work through hands-on activities in which science research is introduced. Students are expected to spend an additional 100 hours on self-study, preparation work for the laboratory, and writing reports. Continuous assessment tasks (100%) include written assignments (totaling no more than 8,000 words) such as laboratory report for each experiment (normally no more than 10 experiments) and essays. Details of the assessment tasks can be found in the description of individual courses.

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

Students have to undertake at least 160 hours of internship work. Internships aim to offer students the opportunity to gain work experience related to their major of study. The teacher meets with the student regularly to discuss work progress. Students have to undertake at least 160 hours of internship work arranged formally. Assessment tasks normally include the following outputs: a written report of no more than 2000 words and feedback from the internship supervisor and an oral presentation on students’ internship experience. Details of the assessment tasks can be found in the description of individual courses.
## List of BSc(ActuarSc) Courses* on offer in 2016/17 and 2017/18^  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
<th>Pre-requisite</th>
<th>Available in 2016-2017</th>
<th>Semester offered in</th>
<th>Exam held in</th>
<th>Quota</th>
<th>Course Coordinator</th>
<th>Programme / Major / Minor (The Programme/Major/Minor that this course appears as)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAES1000</td>
<td>Core University English</td>
<td>6</td>
<td>NIL</td>
<td>Y Y</td>
<td>1, 2</td>
<td>Dec, May</td>
<td>---</td>
<td>Dr N Fong, English</td>
<td>CAES in Core University English</td>
</tr>
<tr>
<td>CAES9820</td>
<td>Academic English for science students</td>
<td>6</td>
<td>NIL</td>
<td>Y Y</td>
<td>1, 2</td>
<td>No Exam</td>
<td>---</td>
<td>Ms E Law, English</td>
<td>CAES in Core University English</td>
</tr>
<tr>
<td>CSCI0001</td>
<td>Practical Chinese for science students</td>
<td>6</td>
<td>NIL</td>
<td>Y Y</td>
<td>1, 2</td>
<td>Dec, May</td>
<td>---</td>
<td>Mr K W Wong, Chinese</td>
<td>CSCI in Core University English</td>
</tr>
<tr>
<td>MATH1821</td>
<td>Mathematical methods for actuarial science I</td>
<td>6</td>
<td>Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4 or above in HKDSE Mathematics plus Module 2, or Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in these courses. For BSc(ActuarSc) students only.</td>
<td>Y Y</td>
<td>1</td>
<td>Dec</td>
<td>---</td>
<td>Dr J T Chan, Mathematics</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>MATH2822</td>
<td>Mathematical methods for actuarial science II</td>
<td>6</td>
<td>Pass in MATH1821. For BSc(ActuarSc) students only.</td>
<td>Y Y</td>
<td>2</td>
<td>May</td>
<td>---</td>
<td>Dr J T Chan, Mathematics</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>STAT2901</td>
<td>Financial mathematics</td>
<td>6</td>
<td>Pass in MATH1821 (for BSc(ActuarSc) students) or already enrolled in this course, or Pass in MATH1013 or already enrolled in this course (for students outside the BSc(ActuarSc) programme); and Not for students who have passed or enrolled in any of these courses: STAT1601, STAT1602, STAT2601, STAT1603</td>
<td>Y Y</td>
<td>2</td>
<td>May</td>
<td>---</td>
<td>Prof J J F Yao, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>STAT2902</td>
<td>Statistical inference</td>
<td>6</td>
<td>Pass in STAT2901, or already enrolled in this course; and Not for students who have passed in STAT3615, or already enrolled in this course.</td>
<td>Y Y</td>
<td>2</td>
<td>May</td>
<td>---</td>
<td>Prof K C Yuen, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
</tbody>
</table>

* This list only includes courses offered by the Department of Statistics & Actuarial Science and the Department of Mathematics and language courses.  
^ Availability of courses in 2017-2018 is subject to change.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
<th>Pre-requisite</th>
<th>Available in 2016-2017</th>
<th>Semester offered in 2016-2017</th>
<th>Exam held in 2016-2017</th>
<th>Quota</th>
<th>Course Coordinator</th>
<th>Programme / Major / Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3902</td>
<td>Statistical models</td>
<td>6</td>
<td>Pass in STAT2901; and Not for students who have passed in STAT2902, or already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>Y Y 1</td>
<td>Dec</td>
<td>---</td>
<td>Dr J F Xu, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
<td></td>
</tr>
<tr>
<td>STAT3903</td>
<td>Stochastic models</td>
<td>6</td>
<td>Pass in STAT2901; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3603, or have already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>Y Y 2</td>
<td>May</td>
<td>---</td>
<td>Dr Y K Chung, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
<td></td>
</tr>
<tr>
<td>STAT3904</td>
<td>Corporate finance for actuarial science</td>
<td>6</td>
<td>(Pass in ACCT1101 and STAT2902) or (Pass in STAT3610 and STAT3615); and Not for students who have passed in FINA1310, or have already enrolled in this course.</td>
<td>Y Y 2</td>
<td>May</td>
<td>---</td>
<td>Dr J K Woo, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012); Minor in Actuarial Studies (2016,2015,2014,2013,2012)</td>
<td></td>
</tr>
<tr>
<td>STAT3905</td>
<td>Introduction to financial derivatives</td>
<td>6</td>
<td>Pass in STAT2902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>Y Y 1</td>
<td>Dec</td>
<td>---</td>
<td>Dr E C K Cheung, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
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</tbody>
</table>
### Department of Statistics & Actuarial Science (Cont’d)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
<th>Pre-requisite</th>
<th>Available in</th>
<th>Semester offered in 2016-2017</th>
<th>Exam held in 2016-2017</th>
<th>Quota</th>
<th>Course Coordinator</th>
<th>Program / Major / Minor (The Programme/Major/Minor that this course appears as)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3907</td>
<td>Linear models and forecasting</td>
<td>6</td>
<td>Pass in STAT2602 or STAT3902; or already enrolled in this course; and Not for students who have passed in STAT3600; or have already enrolled in this course; and Not for students who have passed in STAT4601; or have already enrolled in this course; and Not for students who have passed in ECON2280; or have already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>Y Y</td>
<td>2</td>
<td>May</td>
<td>---</td>
<td>Dr G Li, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>STAT3909</td>
<td>Advanced life contingencies</td>
<td>6</td>
<td>Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>Y Y</td>
<td>2</td>
<td>May</td>
<td>---</td>
<td>Prof H L Yang, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>STAT3910</td>
<td>Financial economics I</td>
<td>6</td>
<td>Pass in STAT2602 or STAT3902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course.</td>
<td>Y Y</td>
<td>1</td>
<td>Dec</td>
<td>---</td>
<td>Prof H L Yang, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012); Minor in Actuarial Studies (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>STAT3952</td>
<td>Investment and asset management</td>
<td>6</td>
<td>Pass in STAT3901; and Not for students who have passed in FINA2320, or have already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>N N</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>TBC, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2012)</td>
</tr>
<tr>
<td>STAT3954</td>
<td>Current topics in actuarial science</td>
<td>6</td>
<td>Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
<td>N N</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>Prof W K Li, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Title</td>
<td>Credit</td>
<td>Pre-requisite</td>
<td>Available in 2015-2016</td>
<td>Semester offered in 2016-2017</td>
<td>Exam held in 2016-2017</td>
<td>Quota</td>
<td>Course Coordinator</td>
<td>Programme / Major / Minor that this course appears as</td>
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</tr>
<tr>
<td>STAT4711</td>
<td>Capstone experience for actuarial science undergraduates</td>
<td>6</td>
<td>Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including (Pass in STAT3901, or already enrolled in this course; or Pass in STAT3902, or already enrolled in this course); and This capstone course is only for BSc(Actuarial Science) students, and is mutually exclusive with STAT4767 and STAT4798. The earliest that a student is allowed to take this capstone course is their year 3 study.</td>
<td>Y Y 1, 2</td>
<td>No exam</td>
<td>50</td>
<td>Prof W K Li, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
<td></td>
</tr>
<tr>
<td>STAT4767</td>
<td>Actuarial science internship</td>
<td>6</td>
<td>Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3901; and This capstone course is only for BSc(Actuarial Science) students; and is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.</td>
<td>Y Y 1, 2</td>
<td>No exam</td>
<td>---</td>
<td>Dr L F K Ng, Statistics &amp; Actuarial Science</td>
<td>BSc in Actuarial Science (2016,2015,2014,2013,2012)</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Title</td>
<td>Credit</td>
<td>Pre-requisite Credit</td>
<td>Available in</td>
<td>Semester offered in</td>
<td>Exam held in</td>
<td>Quota</td>
<td>Coordinator</td>
<td>Programme / Major / Minor</td>
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<tr>
<td>STAT4798</td>
<td>Statistics and actuarial science project</td>
<td>6</td>
<td>Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3902 and STAT3907; and Pass or already enrolled in at least one of the following courses: STAT3601, STAT3911, STAT4601, STAT4602; and This capstone course is only for BSc(Actuarial Science) students; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.</td>
<td>Y</td>
<td>Y</td>
<td>1, 2</td>
<td>No exam</td>
<td>50</td>
<td>Prof S M S Lee, Statistics &amp; Actuarial Science</td>
</tr>
</tbody>
</table>
### Table of Equivalence between HKDSE and Other Qualifications

<table>
<thead>
<tr>
<th>HKDSE</th>
<th>Grade</th>
<th>Equivalent Qualification to HKDSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>3 or above</td>
<td>IB: Biology (SL/HL)</td>
</tr>
<tr>
<td>Chemistry</td>
<td>3 or above</td>
<td>IB: Chemistry (SL/HL)</td>
</tr>
<tr>
<td>Physics</td>
<td>3 or above</td>
<td>IB: Physics (SL/HL)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2 or above</td>
<td>IB: Mathematics (SL)/Mathematical Studies (SL)</td>
</tr>
<tr>
<td>Mathematics + (M1 or M2)</td>
<td>2 or above</td>
<td>IB: Mathematics (HL)/Mathematical Studies (HL)</td>
</tr>
</tbody>
</table>

**Note:**
- HL: Higher Level
- SL: Standard Level
- AL: Advanced Level

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

*For other non-science students admitted through non-JUPAS scheme, they are still required to obtain the written approval from the Course Selection Adviser of the course offering department even they have possessed the equivalent HKDSE subject qualification(s) to meet the course prerequisite requirement. Once approval is given, they need to forward it to their home faculties to add the course on-line.*
**Programme Title:** BSc in Actuarial Science  
**Offered to students admitted to Year 1 in:** 2016  

**Objectives:**  
The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

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

- **PLO 1:** understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)  
- **PLO 2:** understand and identify the nature of insurance, finance and investment risks (by means of coursework and tutorial classes and/or research-based project in the curriculum)  
- **PLO 3:** develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues (by means of coursework and tutorial classes and/or research-based project in the curriculum)  
- **PLO 4:** formulate effective business strategies to manage various kinds of risk (by means of coursework and tutorial classes and/or research-based project in the curriculum)  
- **PLO 5:** communicate and collaborate with people effectively on issues related to actuarial science (by means of coursework and tutorial classes and/or research-based project in the curriculum)  
- **PLO 6:** discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**Impermissible Combinations:**  
Minor in Actuarial Studies

<table>
<thead>
<tr>
<th>Required courses (138 credits)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Year I Courses</strong></td>
<td></td>
</tr>
<tr>
<td>Core courses (42 credits):</td>
<td></td>
</tr>
<tr>
<td><strong>Disciplinary Core Courses</strong> (42 credits)</td>
<td></td>
</tr>
<tr>
<td>ACCT1101</td>
<td>Introduction to financial accounting (6)</td>
</tr>
<tr>
<td>ECON1210</td>
<td>Introductory microeconomics (6)</td>
</tr>
<tr>
<td>ECON1220</td>
<td>Introductory macroeconomics (6)</td>
</tr>
<tr>
<td>MATH2821</td>
<td>Mathematical methods for actuarial science I (6)</td>
</tr>
<tr>
<td>STAT2901</td>
<td>Probability and statistics: foundations of actuarial science (6)</td>
</tr>
<tr>
<td>STAT2902</td>
<td>Financial mathematics (6)</td>
</tr>
<tr>
<td><strong>2. Year II Courses</strong></td>
<td></td>
</tr>
<tr>
<td>Core courses (42 credits):</td>
<td></td>
</tr>
<tr>
<td><strong>Disciplinary Core Courses</strong> (42 credits)</td>
<td></td>
</tr>
<tr>
<td>COMP1117</td>
<td>Computer programming (6)</td>
</tr>
<tr>
<td>STAT3901</td>
<td>Life contingencies (6)</td>
</tr>
<tr>
<td>STAT3902</td>
<td>Statistical models (6)</td>
</tr>
<tr>
<td>STAT3903</td>
<td>Stochastic models (6)</td>
</tr>
<tr>
<td>STAT3904</td>
<td>Corporate finance for actuarial science (6)</td>
</tr>
<tr>
<td>STAT3905</td>
<td>Introduction to financial derivatives (6)</td>
</tr>
<tr>
<td>STAT3906</td>
<td>Risk theory I (6)</td>
</tr>
<tr>
<td><strong>3. Year III Courses</strong></td>
<td></td>
</tr>
<tr>
<td>Core courses (30 credits)</td>
<td></td>
</tr>
<tr>
<td>STAT3907</td>
<td>Linear models and forecasting (6)</td>
</tr>
<tr>
<td>STAT3908</td>
<td>Credibility theory and loss distributions (6)</td>
</tr>
<tr>
<td>STAT3909</td>
<td>Advanced life contingencies (6)</td>
</tr>
<tr>
<td>STAT3910</td>
<td>Financial economics I (6)</td>
</tr>
<tr>
<td>STAT3911</td>
<td>Financial economics II (6)</td>
</tr>
<tr>
<td><strong>4. Year IV Courses</strong></td>
<td></td>
</tr>
<tr>
<td>Core Electives (18 credits):</td>
<td></td>
</tr>
<tr>
<td>At least 18 credits from List A and List B, with at least 12 credits from List A:</td>
<td></td>
</tr>
<tr>
<td><strong>List A</strong></td>
<td></td>
</tr>
<tr>
<td>STAT3951</td>
<td>Advanced contingencies (6)</td>
</tr>
<tr>
<td>STAT3954</td>
<td>Current topics in actuarial science (6)</td>
</tr>
<tr>
<td>STAT3955</td>
<td>Survival analysis (6)</td>
</tr>
<tr>
<td>STAT3956</td>
<td>Pension funds and pension mathematics (6)</td>
</tr>
<tr>
<td>STAT4607</td>
<td>Credit risk analysis (6)</td>
</tr>
<tr>
<td>STAT4608</td>
<td>Market risk analysis (6)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>STAT4901</td>
<td>Risk theory II</td>
</tr>
<tr>
<td>STAT4903</td>
<td>Actuarial techniques for general insurance</td>
</tr>
<tr>
<td>STAT3602</td>
<td>Statistical inference</td>
</tr>
<tr>
<td>STAT3612</td>
<td>Data mining</td>
</tr>
<tr>
<td>STAT3616</td>
<td>Advanced SAS programming</td>
</tr>
<tr>
<td>STAT3953</td>
<td>Fundamentals of actuarial practice</td>
</tr>
<tr>
<td>STAT4602</td>
<td>Multivariate data analysis</td>
</tr>
<tr>
<td>STAT4902</td>
<td>Selected topics in actuarial science</td>
</tr>
</tbody>
</table>

**List B**

5. **Capstone requirement (6 credits)**

At least 6 credits selected from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4711</td>
<td>Capstone experience for actuarial science undergraduates</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT4767</td>
<td>Actuarial science internship</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT4798</td>
<td>Statistics and actuarial science project</td>
<td>(6)</td>
</tr>
</tbody>
</table>

**Notes:**
1. Students are expected to be in full-time status for eight academic semesters (in addition to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BSc(ActuarSc) programme, provided that they fully satisfy the 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 programme in order to satisfy the degree graduation requirements.
Programme Title: BSc in Actuarial Science
Offered to students admitted to Year 1 in 2015

Objectives:
The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

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

**PLO 1**: understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**PLO 2**: understand and identify the nature of insurance, finance and investment risks (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**PLO 3**: develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**PLO 4**: formulate effective business strategies to manage various kinds of risk (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**PLO 5**: communicate and collaborate with people effectively on issues related to actuarial science (by means of coursework and tutorial classes and/or research-based project in the curriculum)

**PLO 6**: discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses (by means of coursework and tutorial classes and/or research-based project in the curriculum)

Impermissible Combinations:
Minor in Actuarial Studies

Required courses (138 credits)

1. **Year I Courses**
   **Core courses (42 credits):**
   **Disciplinary Core Courses (42 credits)**
   - ACCT1101 Introduction to financial accounting (6)
   - ECON1210 Introductory microeconomics (6)
   - ECON1220 Introductory macroeconomics (6)
   - MATH1821 Mathematical methods for actuarial science I (6)
   - STAT2901 Probability and statistics: foundations of actuarial science (6)
   - STAT2902 Financial mathematics (6)

2. **Year II Courses**
   **Disciplinary Core Courses (42 credits)**
   - COMP1117 Computer programming (6)
   - STAT3901 Life contingencies (6)
   - STAT3902 Statistical models (6)
   - STAT3903 Stochastic models (6)
   - STAT3904 Corporate finance for actuarial science (6)
   - STAT3905 Introduction to financial derivatives (6)
   - STAT3906 Risk theory I (6)

3. **Year III Courses**
   **Disciplinary Core Courses (30 credits)**
   - STAT3907 Linear models and forecasting (6)
   - STAT3908 Credibility theory and loss distributions (6)
   - STAT3909 Advanced life contingencies (6)
   - STAT3910 Financial economics I (6)
   - STAT3911 Financial economics II (6)

4. **Year IV Courses**
   **Disciplinary Electives (18 credits)**
   At least 18 credits from List A and List B, with at least 12 credits from List A:
   **List A**
   - STAT3951 Advanced contingencies (6)
   - STAT3954 Current topics in actuarial science (6)
   - STAT3955 Survival analysis (6)
   - STAT3956 Pension funds and pension mathematics (6)
   - STAT4607 Credit risk analysis (6)
   - STAT4608 Market risk analysis (6)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4901</td>
<td>Risk theory II</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT4903</td>
<td>Actuarial techniques for general insurance</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT3602</td>
<td>Statistical inference</td>
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<tr>
<td>STAT4902</td>
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<td>(6)</td>
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5. **Capstone requirement (6 credits)**

At least 6 credits selected from the following courses:

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<td>Statistics and actuarial science project</td>
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**Notes:**

1. Students are expected to be in full-time status for eight academic semesters (in addition to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BSc(ActuarSc) programme, provided that they fully satisfy the 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 programme in order to satisfy the degree graduation requirements.
Programme Title: BSc in Actuarial Science  
Offered to students admitted to Year 1 in 2014

Objectives:  
The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

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

PLO 1: understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 2: understand and identify the nature of insurance, finance and investment risks (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 3: develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 4: formulate effective business strategies to manage various kinds of risk (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 5: communicate and collaborate with people effectively on issues related to actuarial science (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 6: discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses (by means of coursework and tutorial classes and/or research-based project in the curriculum)

Impermissible Combinations:  
Minor in Actuarial Studies

Required courses (138 credits)

1. Year I Courses  
Disciplinary Core Courses (42 credits)

ACCT1101 Introduction to financial accounting (6)  
ECON1210 Introductory microeconomics (6)  
ECON1220 Introductory macroeconomics (6)  
MATH1821 Mathematical methods for actuarial science I (6)  
MATH2822 Mathematical methods for actuarial science II (6)  
STAT2901 Probability and statistics: foundations of actuarial science (6)  
STAT2902 Financial mathematics (6)

2. Year II Courses  
Disciplinary Core Courses (42 credits)

COMP1117 Computer programming (6)  
STAT3901 Life contingencies (6)  
STAT3902 Statistical models (6)  
STAT3903 Stochastic models (6)  
STAT3904 Corporate finance for actuarial science (6)  
STAT3905 Introduction to financial derivatives (6)  
STAT3906 Risk theory I (6)

3. Year III Courses  
Disciplinary Core Courses (30 credits)

STAT3907 Linear models and forecasting (6)  
STAT3908 Credibility theory and loss distributions (6)  
STAT3909 Advanced life contingencies (6)  
STAT3910 Financial economics I (6)  
STAT3911 Financial economics II (6)

4. Year IV Courses  
Disciplinary Electives (18 credits)

At least 18 credits from List A and List B, with at least 12 credits from List A:

List A  
STAT3951 Advanced contingencies (6)  
STAT3954 Current topics in actuarial science (6)  
STAT3955 Survival analysis (6)  
STAT3956 Pension funds and pension mathematics (6)  
STAT4607 Credit risk analysis (6)  
STAT4608 Market risk analysis (6)  
STAT4901 Risk theory II (6)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4903</td>
<td>Actuarial techniques for general insurance</td>
<td>6</td>
</tr>
<tr>
<td>STAT3602</td>
<td>Statistical inference</td>
<td>6</td>
</tr>
<tr>
<td>STAT3612</td>
<td>Data mining</td>
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<td>Advanced SAS programming</td>
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<td>STAT3953</td>
<td>Fundamentals of actuarial practice</td>
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<td>Multivariate data analysis</td>
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</tr>
<tr>
<td>STAT4902</td>
<td>Selected topics in actuarial science</td>
<td>6</td>
</tr>
</tbody>
</table>

5. **Capstone requirement (6 credits)**

*At least 6 credits selected from the following courses:*

- STAT4711  | Capstone experience for actuarial science undergruates | 6 |
- STAT4767  | Actuarial science internship                        | 6 |
- STAT4798  | Statistics and actuarial science project           | 6 |

**Notes:**
1. Students are expected to be in full-time status for eight academic semesters (in addition to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BSc(ActuarSc) programme, provided that they fully satisfy the 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 programme in order to satisfy the degree graduation requirements.
Program Title: BSc in Actuarial Science

Offered to students admitted to Year 1 in 2013

Objectives:
The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

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

- **PLO 1**: understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- **PLO 2**: understand and identify the nature of insurance, finance and investment risks (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- **PLO 3**: develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues (by means of coursework and tutorial classes and/or research-based project in the curriculum)
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- **PLO 5**: communicate and collaborate with people effectively on issues related to actuarial science (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- **PLO 6**: discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses (by means of coursework and tutorial classes and/or research-based project in the curriculum)

Impermissible Combinations:
Minor in Actuarial Studies

Required courses (138 credits)

1. **Year I Courses**
   **Disciplinary Core Courses (42 credits)**
   - ACCT1101 Introduction to financial accounting (6)
   - ECON1210 Introductory microeconomics (6)
   - ECON1220 Introductory macroeconomics (6)
   - MATH1B21 Mathematical methods for actuarial science I (6)
   - MATH2B22 Mathematical methods for actuarial science II (6)
   - STAT2901 Probability and statistics: foundations of actuarial science (6)
   - STAT2902 Financial mathematics (6)

2. **Year II Courses**
   **Disciplinary Core Courses (42 credits)**
   - COMP1117 Computer programming (6)
   - STAT3901 Life contingencies (6)
   - STAT3902 Statistical models (6)
   - STAT3903 Stochastic models (6)
   - STAT3904 Corporate finance for actuarial science (6)
   - STAT3905 Introduction to financial derivatives (6)
   - STAT3906 Risk theory I (6)

3. **Year III Courses**
   **Disciplinary Core Courses (30 credits)**
   - STAT3907 Linear models and forecasting (6)
   - STAT3908 Credibility theory and loss distributions (6)
   - STAT3909 Advanced life contingencies (6)
   - STAT3910 Financial economics I (6)
   - STAT3911 Financial economics II (6)

4. **Year IV Courses**
   **Disciplinary Electives (18 credits)**
   At least 18 credits from List A and List B, with at least 12 credits from List A:
   **List A**
   - STAT3951 Advanced contingencies (6)
   - STAT3954 Current topics in actuarial science (6)
   - STAT3955 Survival analysis (6)
   - STAT3956 Pension funds and pension mathematics (6)
   - STAT4607 Credit risk analysis (6)
   - STAT4608 Market risk analysis (6)
   - STAT4901 Risk theory II (6)
### List B

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4903</td>
<td>Actuarial techniques for general insurance</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT3602</td>
<td>Statistical inference</td>
<td>(6)</td>
</tr>
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<td>STAT4602</td>
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</tr>
<tr>
<td>STAT4902</td>
<td>Selected topics in actuarial science</td>
<td>(6)</td>
</tr>
</tbody>
</table>

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

At least 6 credits selected from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4711</td>
<td>Capstone experience for actuarial science</td>
<td>(6)</td>
</tr>
<tr>
<td>STAT4711</td>
<td>Capstone experience for actuarial science</td>
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<td>STAT4767</td>
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</tr>
</tbody>
</table>

### Notes:

1. Students are expected to be in full-time status for eight academic semesters (in additional to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BSc(ActuarSc) programme, provided that they fully satisfy the requirements.

3. The course title of ECON1210 Introductory microeconomics in 2013-14 or before is Introduction to economics I.

4. The course title of ECON1220 Introductory macroeconomics in 2013-14 or before is Introduction to economics 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 programme in order to satisfy the degree graduation requirements.
Programme Title: BSc in Actuarial Science
Offered to students admitted to Year 1 in 2012

Objectives:
The Actuarial Science curriculum aims at providing formal academic and professional training to students who wish to join the actuarial profession. Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training. The programme is set up to equip students with solid background in actuarial science, to develop their confidence and analytical skills to define and tackle problems in actuarial science and other related fields. Specifically, the programme is designed to provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation. In addition, the programme provides enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.

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

PLO 1: understand and apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 2: understand and identify the nature of insurance, finance and investment risks (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 3: develop analytical skills to evaluate and measure various kinds of risk, and appraise the related moral and ethical issues (by means of coursework and tutorial classes and/or research-based project in the curriculum)

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PLO 5: communicate and collaborate with people effectively on issues related to actuarial science (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 6: discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses (by means of coursework and tutorial classes and/or research-based project in the curriculum)

Impermissible Combinations:
Minor in Actuarial Studies

Required courses (138 credits)
1. Year I Courses
Disciplinary Core Courses (42 credits)

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<td>ACCT1101</td>
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<td>ECON1210</td>
<td>Introductory microeconomics</td>
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<td>ECON1220</td>
<td>Introductory macroeconomics</td>
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<td>MATH1821</td>
<td>Mathematical methods for actuarial science I</td>
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<tr>
<td>MATH2822</td>
<td>Mathematical methods for actuarial science II</td>
<td>6</td>
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</table>

2. Year II Courses
Disciplinary Core Courses (42 credits)

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<tr>
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</thead>
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<td>COMP1117</td>
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<td>STAT3901</td>
<td>Life contingencies</td>
<td>6</td>
</tr>
<tr>
<td>STAT3902</td>
<td>Statistical models</td>
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3. Year III Courses
Disciplinary Core Courses (30 credits)

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<tr>
<td>STAT3909</td>
<td>Advanced life contingencies</td>
<td>6</td>
</tr>
<tr>
<td>STAT3910</td>
<td>Financial economics I</td>
<td>6</td>
</tr>
<tr>
<td>STAT3911</td>
<td>Financial economics II</td>
<td>6</td>
</tr>
</tbody>
</table>

4. Year IV Courses
Disciplinary Electives (18 credits)

At least 18 credits from List A and List B, with at least 12 credits from List A:

List A

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT3951</td>
<td>Advanced contingencies</td>
<td>6</td>
</tr>
<tr>
<td>STAT3954</td>
<td>Current topics in actuarial science</td>
<td>6</td>
</tr>
<tr>
<td>STAT3955</td>
<td>Survival analysis</td>
<td>6</td>
</tr>
<tr>
<td>STAT3956</td>
<td>Pension funds and pension mathematics</td>
<td>6</td>
</tr>
<tr>
<td>STAT4607</td>
<td>Credit risk analysis</td>
<td>6</td>
</tr>
<tr>
<td>STAT4608</td>
<td>Market risk analysis</td>
<td>6</td>
</tr>
<tr>
<td>STAT4901</td>
<td>Risk theory II</td>
<td>6</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>STAT4903</td>
<td>Actuarial techniques for general insurance</td>
<td>6</td>
</tr>
<tr>
<td>STAT3602</td>
<td>Statistical inference</td>
<td>6</td>
</tr>
<tr>
<td>STAT3612</td>
<td>Data mining</td>
<td>6</td>
</tr>
<tr>
<td>STAT3616</td>
<td>Advanced SAS programming</td>
<td>6</td>
</tr>
<tr>
<td>STAT3952</td>
<td>Investment and asset management</td>
<td>6</td>
</tr>
<tr>
<td>STAT3953</td>
<td>Fundamentals of actuarial practice</td>
<td>6</td>
</tr>
<tr>
<td>STAT4602</td>
<td>Multivariate data analysis</td>
<td>6</td>
</tr>
<tr>
<td>STAT4902</td>
<td>Selected topics in actuarial science</td>
<td>6</td>
</tr>
</tbody>
</table>

5. **Capstone requirement (6 credits)**

At least 6 credits selected from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT4711</td>
<td>Capstone experience for actuarial science</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>undergraduates</td>
<td></td>
</tr>
<tr>
<td>STAT4767</td>
<td>Actuarial science internship</td>
<td>6</td>
</tr>
<tr>
<td>STAT4798</td>
<td>Statistics and actuarial science project</td>
<td>6</td>
</tr>
</tbody>
</table>

**Notes:**

1. Students are expected to be in full-time status for eight academic semesters (in additional to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BSc(ActuarSc) programme, provided that they fully satisfy the requirements.

3. The course title of ECON1210 Introductory microeconomics in 2013-14 or before is Introduction to economics I.

4. The course title of ECON1220 Introductory macroeconomics in 2013-14 or before is Introduction to economics 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 programme in order to satisfy the degree graduation requirements.
## Course Descriptions

### CAES1000 Core University English (6 credits)

**Offering Department:** English  
**Course Co-ordinator:** Dr N Fong, English (fongsn@hku.hk)  
**Teachers Involved:** Dr N Fong, Centre for Applied English Studies

**Course Type:** Lecture-based course

**Course Learning Outcomes:**
- CLO 1: Identify and distinguish between main ideas and supporting details in lectures and written texts and demonstrate an understanding of the arguments / facts expressed.
- CLO 2: Form and express personal opinions through critical reading and listening.
- CLO 3: Argue for and defend a position in a clear and structured way using academic sources, through writing and speaking.
- CLO 4: Demonstrate control of grammatical accuracy and lexical appropriacy in academic communication.

**Course Contents & Topics:**
The Core University English (CUE) course aims to enhance first-year students' academic English language proficiency in the university context. CUE focuses on developing students' academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Students will also complete four online-learning modules through the Moodle platform on academic grammar, academic vocabulary, citation and referencing skills and understanding and avoiding plagiarism. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.

**Pre-requisites:**
NIL

**Offer in 2016 - 2017:**
Offer in 2017 - 2018: Y

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

**Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping**

<table>
<thead>
<tr>
<th>Assessment Methods and Weighting</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>65</td>
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<td></td>
</tr>
<tr>
<td>Examination</td>
<td>35</td>
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**Quota:**

<table>
<thead>
<tr>
<th></th>
<th>1st sem</th>
<th>2nd sem</th>
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<tbody>
<tr>
<td>Y</td>
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<table>
<thead>
<tr>
<th></th>
<th>Examination</th>
<th>Dec</th>
<th>May</th>
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<tbody>
<tr>
<td>A</td>
<td></td>
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<tr>
<td>B</td>
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<td></td>
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<td>C</td>
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<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail</td>
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**Methods Details:**

<table>
<thead>
<tr>
<th></th>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
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<tr>
<td>Tutorials</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Reading / Self study</td>
<td>84</td>
<td></td>
<td></td>
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**Assessment Methods:**

<table>
<thead>
<tr>
<th></th>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Course Objectives

This six credit English-in-the-Discipline course will be offered to second year students studying in the Science Faculty. This course will help students develop the necessary skills to use both written and spoken English within their studies. Students will learn to better communicate and spontaneously discuss general and scientific concepts within their division, with other scientists as well as to a larger audience. Particular emphasis will be placed on enabling students to identify their own language needs and develop appropriate self-learning strategies to improve their proficiency.

### Course Contents & Topics

Topics covered in the course will be:
- Finding, evaluating and using appropriate academic source materials;
- Compiling an academic bibliography;
- Contrasting academic and popular genres of Science;
- Writing for a specific audience, including stance, shared knowledge, levels of formality; and
- Organizing and articulating ideas in an academically suitable format including appropriate vocabulary and grammar; and
- Critically examine their own language proficiency and analyze how that relates to their ability to perform successfully within their discipline. Developing self-directed learning strategies.

### Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1 identify and summarize disciplinary sources related to a specified topic

CLO 2 produce texts (written and spoken) appropriate for a cross-disciplinary audience based on their disciplinary knowledge

CLO 3 identify their own language learning needs and implement a plan to meet those needs

### Pre-requisites (and Co-requisites and Impermissible combinations)

NIL

### Offer in 2016 - 2017

Y 1st sem 2nd sem Offer in 2017 - 2018 : Y

### Grade Descriptors (A+ to F)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent result. Consistently demonstrates ability to summarize salient points accurately from appropriate and reliable sources using original language. Text uses sources appropriately and demonstrates accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are clearly identified and aligned with evidence of planning, self-study and reflection.</td>
</tr>
<tr>
<td>B</td>
<td>Good to very good result. Usually demonstrates ability to summarize salient points accurately using mostly original language. Text mostly uses sources appropriately and demonstrates mostly accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are stated with some reference to evidence of planning and reflection although there is some misalignment between goals and self-study completed.</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory to reasonably good result. Demonstrates some ability to summarize salient points using mostly original language although some inaccuracies are present. Text uses some sources appropriately and demonstrates appropriate but simple grammatical and lexical characteristics with some organizational flaws. Language learning needs are stated with some limited evidence of planning and reflection but goals and self-study are misaligned.</td>
</tr>
<tr>
<td>D</td>
<td>Barely satisfactory result. Demonstrates a limited ability to summarize salient points from sources with inaccuracies and little original language. Text uses sources inappropriately and demonstrates grammatical inaccuracy, inappropriate lexical choices and organizational flaws. There is a minimal statement of language learning needs, planning and reflection with little or no apparent alignment between goals and self-study.</td>
</tr>
<tr>
<td>Fail</td>
<td>Unsatisfactory result. Does not demonstrate ability to summarize salient points identify, interpret or appropriately paraphrase reliable sources. Text uses no sources and demonstrates serious grammatical, lexical and/or organizational errors. Does not demonstrate any meaningful attempt to identify language learning needs or implement a plan.</td>
</tr>
</tbody>
</table>

### Course Type

Lecture-based course

### Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorials</td>
<td>seminars</td>
<td>36</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td>independent learning work</td>
<td>120</td>
</tr>
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### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>independent learning work</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Essay</td>
<td>other genres of writing</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

### Required/recommended reading and online materials

Course materials to be provided electronically through course website.

### Course Website

http://caes.hku.hk/caes9820/

### Additional Course Information

This a compulsory course for all students studying undergraduate degrees in the Faculty of Science.
CSCI9001 Practical Chinese for science students (6 credits) Academic Year 2016

Offering Department Chinese
Course Co-ordinator Mr K W Wong, Chinese (kwongb@hkusua.hku.hk)

Teachers Involved Dr C M Chan, Chinese  Dr K T Lam, Chinese  Dr S F Lee, Chinese  Mr K W Wong, Chinese

Course Objectives
This course aims to enhance the students’ competence using Chinese for professional communication. It helps the students to master the techniques of writing different types of documents such as memos, emails, letters, announcements, notice, brochures, leaflets, and reports. In addition, topics addressing presentation and discussion techniques, the style and rhetoric of reader-based writings are included to heighten the students’ linguistic sensitivity.

Course Contents & Topics

Course Learning Outcomes
On successful completion of this course, students should be able to:

CLO 1 develop a balanced competency in modern Chinese and write well-formed sentences
CLO 2 employ rhetorical devices and stylistics, as well as practical writing skills specific to their discipline
CLO 3 explore new tactics of communication, initiate discussions and debates and address new challenges
CLO 4 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 (and Co-requisites and Impermissible combinations) NIL


Grade Descriptors (A+ to F)
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.

Course Type Lecture-based course

Course Teaching & Learning Activities Activities Details No. of Hours
Lectures
Tutorials Small group tutorials 12
Group work Workshops 24
Discussion 24
Reading / Self study Reading/self study (20 hours) and preparation (12 hours) 32
Assessment 16

Assessment Methods and Weighting Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping
Assignments Self-access & online exercises (40%) and Tutorial discussion (10%) 50
Examination 50

Required/recommended reading and online materials
MATH1821 Mathematical methods for actuarial science I (6 credits)

Offering Department: Mathematics  Quota: ---

Course Co-ordinator: Dr J T Chan, Mathematics (jtchan@hku.hk)

Teachers Involved: Dr J T Chan, Mathematics

Course Objectives:
This course is the first of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses on single variable calculus and elementary matrix theory. It aims at students with Core Mathematics plus Module 1 or Core Mathematics plus Module 2 background.

Course Contents & Topics:
- Functions; graphs; inverse functions.
- Limits, continuity and differentiability.
- Mean value theorem; implicit differentiation; L'Hopital's rule.
- Bisection method and Newton's method.
- Higher order derivatives, maxima and minima, graph sketching.
- Taylor approximation and error estimation.
- Improper integrals, partial fractions, integration by parts.
- Numerical integration, Trapezoidal rule and Simpson's rule.
- Basic matrix and vector (of orders 2 and 3) operations, determinants.
- Simple differential equations.

Course Learning Outcomes:
On successful completion of this course, students should be able to:

CLO 1 describe properties of a function and an inverse function
CLO 2 evaluate various kinds of limits, and determine continuity and differentiability of functions
CLO 3 apply advanced rules/techniques of differentiation and integration to compute derivatives and integrals; sketch graphs of functions
CLO 4 approximate integrals by numerical methods
CLO 5 perform matrix and vector operations, compute determinants
CLO 6 solve simple first and second order ordinary differential equations

Pre-requisites (and Co-requisites and Impermissible combinations):
Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4 or above in HKDSE Mathematics plus Module 2, or equivalent; and
Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in these courses.
For BSc(ActuarSc) students only.

Offer in 2016 - 2017: Y  1st sem
Offer in 2017 - 2018: Y
Examination: Dec

Grade Descriptors (A+ to F):
A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.
B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.
C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.
D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.
Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.

Course Type: Lecture-based course

Course Teaching & Learning Activities:
Activities Details No. of Hours
Lectures  36
Tutorials  12
Reading / Self study  100

Assessment Methods and Weighting:
Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping
Examination  50 CLO 1,2,3,4,5,6
Test  2 tests  50 CLO 1,2,3,4,5,6

Required/recommended reading and online materials:
George B. Thomas; as revised by Maurice D. Weir and Joel Hass: Thomas’ Calculus (Addison Wesley, 12th edition)
Steven J. Leon: Linear Algebra with Applications (Pearson Prentice Hall)

Course Website: moodle.hku.hk
<table>
<thead>
<tr>
<th>MATH2822</th>
<th>Mathematical methods for actuarial science II (6 credits)</th>
<th>Academic Year</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering Department</td>
<td>Mathematics</td>
<td>Quota</td>
<td>---</td>
</tr>
<tr>
<td>Course Co-ordinator</td>
<td>Dr J T Chan, Mathematics (<a href="mailto:jtchan@hku.hk">jtchan@hku.hk</a>)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers Involved</td>
<td>Dr J T Chan, Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Objectives</td>
<td>This course is the second of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses on multivariable calculus and linear algebra. It aims at students with MATH1821. It can be followed by other 2000 or 3000 level mathematics courses.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Course Contents & Topics | - Matrices, systems of linear equations, determinants.  
- Eigenvectors and eigenvalues, diagonalization of matrices.  
- Quadratic functions and their standard forms.  
- Vector spaces and subspaces.  
- Functions of several variables; partial differentiation.  
- Gradients and directional derivatives.  
- Taylor approximation, Newton's method.  
- Maxima and minima; Lagrange multipliers.  
- Double and triple integrals, areas and volumes. | | |
| Course Learning Outcomes | On successful completion of this course, students should be able to:  
CLO 1 understand and recognize various topics in linear algebra such as the basic arithmetic of matrices, determinants, systems of linear equations, eigenvalues and eigenvectors, diagonalizable matrices, basis and dimension, and the rank-nullity theorem  
CLO 2 understand and recognize various topics in functions of several variables including partial differentiation, the Hessian test for local extrema, vector-valued functions, Jacobians, the method of Lagrange multipliers, double/triple integrals and the change of variable formula | | |
| Pre-requisites (and Co-requisites and Impermissible combinations) | Pass in MATH1821. For BSc(ActuarSc) students only. | | |
| Grade Descriptors (A+ to F) | A | Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems. | | |
| | B | Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and their applications and presentation or with some minor computational errors. | | |
| | C | Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors. | | |
| | D | Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors. | | |
| | Fail | Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution. | | |
| Course Type | Lecture-based course | | |
| Course Teaching & Learning Activities | Activities | Details | No. of Hours |
| | Lectures | | 36 |
| | Tutorials | | 12 |
| | Reading / Self study | | 100 |
| Assessment Methods and Weighting | Methods | Details | Weighting in final course grade (%) | Assessment Methods to CLO Mapping |
| | Examination | | | |
| | Test | | 50 | CLO 1,2 |
| | 2 tests | | 50 | CLO 1,2 |
| Required/recommended reading and online materials | George B. Thomas; as revised by Maurice D. Weir and Joel Hass: Thomas' Calculus (Addison Wesley, 12th edition)  
Steven J. Leon: Linear Algebra with Applications (Pearson Prentice Hall) | | |
| Course Website | moodle.hku.hk | | |
Course Contents & Topics

1. General Probability
   - Basic elements of probability in set notation
   - Mutually exclusive events
   - Addition and multiplication rules
   - Independence of events
   - Combinatorial probability
   - Conditional probability and expectations
   - Bayes Theorem / Law of total probability
   - Random variables

2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, chi-square, beta, Pareto, lognormal, gamma, Weibull and normal) and bivariate normal distribution
   - Probability functions and probability density functions
   - Cumulative distribution functions
   - Mode, median, percentiles and moments
   - Variance and measures of dispersion
   - Central Limit Theorem

3. Sampling distributions and introduction of estimation
   - Central Limit Theorem
   - Variance and measures of dispersion
   - Mode, median, percentiles and moments
   - Cumulative distribution functions

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1. Understand the mathematical theory underlying the modern practice of statistics

CLO 2. Develop skills in probabilistic analysis for problems involving randomness

CLO 3. Apply techniques in probability and statistics to solve actuarial science problems

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in MATH1821 for BSc(ActuarSc) students or already enrolled in this course, or
Pass in MATH1013 or already enrolled in this course for students outside the BSc(ActuarSc) programme; and
Not for students who have passed or enrolled in any of these courses: STAT1601, STAT1602, STAT2601, STAT1603

Offer in 2016 - 2017

Y 2nd sem Offer in 2017 - 2018: Y

Examination May

Grade Descriptors (A to F)

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

B - Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C - Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D - Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail - Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type

Lecture-based course

Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>(assignments, tutorials, and a class test)</td>
<td>25</td>
<td>CLO 1.2.3</td>
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<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>75</td>
<td>CLO 1.2.3</td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials


M. A. Bean: Probability; The Science of Uncertainty with Applications to Investments, Insurance, and Engineering (Brooks/Cole, Thomas Learning)


Course Website

moodle.hku.hk

Course Contents & Topics

Key topics include: measurement of interest, annuities certain; discounted cash flow analysis; yield rates; amortization schedules and sinking funds; bonds and related securities; practical applications such as real estate mortgage and short sales; stochastic approaches to interest; and key terms of financial analysis such as yield curves, spot rates, forward rates, duration, convexity, and immunization.
**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- **CLO 1** understand the fundamental concepts of financial mathematics
- **CLO 2** learn standard actuarial notations for a variety of annuities
- **CLO 3** do simple discounted cashflow analysis using basic annuities
- **CLO 4** learn the operations of some commonly-encountered financial instruments such as bonds, mortgages, short sales, and so on
- **CLO 5** quote interest in various modes and determine interest rate based on a series of financial transactions
- **CLO 6** deal with Exam FM of the Society of Actuaries

**Pre-requisites (and Co-requisites and Impermissible combinations)**

Pass in STAT2901, or already enrolled in this course, and
Not for students who have passed in STAT3615, or already enrolled in this course.

**Offer in 2016 - 2017**

<table>
<thead>
<tr>
<th>Grade Descriptors (A+ to F)</th>
<th>2016</th>
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<tbody>
<tr>
<td><strong>A</strong></td>
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<td><strong>B</strong></td>
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**Course Type**

Lecture-based course

**Course Teaching & Learning Activities**

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<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
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<tr>
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</tr>
<tr>
<td>Tutorials</td>
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<td>Reading / Self study</td>
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**Assessment Methods and Weighting**

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<tbody>
<tr>
<td>Assignments</td>
<td>(assignments, tutorials, and class test(s))</td>
<td>25 CLO 1,2,3,4,5,6</td>
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<tr>
<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75 CLO 1,2,3,4,5,6</td>
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**Required/recommended reading and online materials**


**Course Website**
moodle.hku.hk

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**STAT3602**

**Statistical inference (6 credits)**

**Offering Department**

Statistics & Actuarial Science

**Course Co-ordinator**

Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)

**Teachers Involved**

Prof S M S Lee, Statistics & Actuarial Science

**Course Objectives**

This course covers the advanced theory of point estimation, interval 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 & Topics**

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.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- **CLO 1** understand the fundamental concepts of financial mathematics
- **CLO 2** learn standard actuarial notations for a variety of annuities
- **CLO 3** do simple discounted cashflow analysis using basic annuities
- **CLO 4** learn the operations of some commonly-encountered financial instruments such as bonds, mortgages, short sales, and so on
- **CLO 5** quote interest in various modes and determine interest rate based on a series of financial transactions
- **CLO 6** deal with Exam FM of the Society of Actuaries

**Pre-requisites (and Co-requisites and Impermissible combinations)**

Pass in STAT2602 or STAT3902

**Offer in 2016 - 2017**

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**Course Type**

Lecture-based course
**Course Teaching & Learning Activities**

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**Required/recommended reading and online materials**


**Course Website**
moodle.hku.hk

**STAT3612**

**Data mining (6 credits)**

**Academic Year**

2016

**Offering Department**

Statistics & Actuarial Science

**Quota**

50

**Course Co-ordinator**

Dr G C S Lui, Statistics & Actuarial Science
capglui@hku.hk

**Teachers Involved**

Dr G C S Lui, Statistics & Actuarial Science

Dr A J Zhang, Statistics & Actuarial Science

**Course Contents & Topics**

Data pre-processing, classification and regression trees, credit scoring, kNN classifier, cluster analysis and neural networks.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- CLO 1 implement data mining process summarized in the acronym SEMMA which stands for sampling, exploring, modifying, modeling, and assessing data
- CLO 2 understand and apply a wide range of data mining techniques, and recognize their characteristics, strengths and weaknesses
- CLO 3 be proficient with the leading data mining software—SAS Enterprise Miner
- CLO 4 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
- CLO 5 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 (and Co-requisites and Impermissible combinations)**

Pass in STAT2602 or (STAT1603 and any University level 2 course) or STAT3902

Co-requisites: STAT3600

**Offer in 2016 - 2017**

Y 1st sem 2nd sem Offer in 2017 - 2018: Y

**Grade Descriptors (A to F)**

- A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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- F: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

**Course Type**

Lecture-based course

**Course Teaching & Learning Activities**

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<td>Project reports</td>
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<td>Test</td>
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<td>CLO 2.3</td>
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**Required/recommended reading and online materials**

Tan, P. N., Steinback, M. and Kumar, V.: Introduction to Data Mining (Addison Wesley, 2014, 3rd edition)


Course Information

Course Website: moodle.hku.hk

Additional Course Information

Course Name: STAT3616
Course Title: Advanced SAS programming
Credit: 6
Offering Department: Statistics & Actuarial Science
Course Code: STAT3616
Course Co-ordinator: Prof K W Ng, Statistics & Actuarial Science
Enquiry: kaising@hku.hk

Course Objectives

Overview of SAS programming. Advanced programming techniques including data simulation, advanced data look-up techniques, modifying transaction datasets and controlling I/O processing and memory.

Course Contents & Topics

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1: Understand the system of SAS and basic programming
CLO 2: Use the BY statement for parallel processing to aid automation
CLO 3: Use the output dataset without printing to OUTPUT windows for piping idea in automation
CLO 4: Use SAS MACRO to develop customized and automated applications
CLO 5: Use advanced SAS programming statements and techniques to solve complex problems

Pre-requisites (and Co-requisites and Impermissible combinations)

Students are strongly recommended to take STAT2603 prior to taking this course.

Offer in 2016 - 2017

Y 2nd sem  Offer in 2017 - 2018: Y

Grade Descriptors (A+ to F)

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Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type

Lecture-based course

Course Teaching & Learning Activities

Activities: Details: No. of Hours
Lectures: 36
Tutorials: 12
Reading / Self study: 100

Assessment Methods and Weights

Methods: Details: Weighting in final course grade (%): Assessment Methods to CLO Mapping
Assignments: Coursework: (assignments, tutorials, and a class test) 50: CLO 1,2,3,4,5
Examination: One 2-hour written examination 50: CLO 1,2,3,4,5

Required/recommended reading and online materials

moodle.hku.hk

Course Website

moodle.hku.hk

STAT3901

Course Name: Life contingencies
Credit: 6
Offering Department: Statistics & Actuarial Science
Course Co-ordinator: Prof K C Yuen, Statistics & Actuarial Science
Enquiry: kcyuen@bku.hk

Course Objectives

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 & Topics

Key topics include: survival distributions; life table functions; select and ultimate tables; life insurance models; life annuity models; benefit premiums.

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1: Calculate the expected values, variances, probabilities, and percentiles for survival-time random variables
CLO 2: Define the continuous survival-time random variable that arises from the discrete survival-time random variable using some assumptions for fractional ages
CLO 3: Define present-value-of-benefit random variables defined on survival-time random variables
CLO 4: 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
CLO 5: Calculate benefit premiums for life insurances and annuities

Pre-requisites (and Co-requisites)

(Pass in STAT2602 and STAT3615) or
(Pass in STAT2902 and (Pass in STAT3902 or already enrolled in this course)) or
(Pass in STAT2602 and STAT2902)
Grade Descriptors

Course Type
Lecture-based course

Course Teaching & Learning Activities

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

Assessment Methods and Weighting

Methods | Details | Weighting in final course grade (%) | Assessment Methods to CLO Mapping
---|---|---|---
Assignments | Coursework (assignments, tutorials, and a class test) | 25 | CLO 1,2,3,4,5
Examination | One 3-hour written examination | 75 | CLO 1,2,3,4,5

Required/recommended reading and online materials

Course Website
moodle.hku.hk

STAT3902
Statistical models (6 credits)

Offering Department
Statistics & Actuarial Science

Quota
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Course Co-ordinator
Dr J F Xu, Statistics & Actuarial Science (xujf@hku.hk)

Teachers Involved
Dr J F Xu, Statistics & Actuarial Science

Course Objectives
This course is on the basis of STAT2901 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 & Topics
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 variances; test hypotheses associated with one-sample and/or two-sample normal distributions, small sample sizes and non-normal distributions with large sample sizes

Course Learning Outcomes
On successful completion of this course, students should be able to:

CLO 1 understand the importance of sufficient statistic(s) in data reduction and statistical inferences such as point estimation, confidence interval estimation, and testing hypothesis
CLO 2 derive maximum likelihood estimators of parameters to calculate maximum likelihood estimates
CLO 3 locate pivotal quantity to construct confidence intervals of parameters
CLO 4 find testing statistic to test hypotheses associated with one-sample and/or two-sample normal distributions with small sample sizes and non-normal distributions with large sample sizes

Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT2901; and Not for students who have passed in STAT2602, or already enrolled in this course; and For BSc(Actuarial Science) students only.

Offer in 2016 - 2017
Y 1st sem Offer in 2017 - 2018 : Y Examination Dec

Grade Descriptors
(A+ to F)

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

B
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C
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D
Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail
Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type
Lecture-based course

Course Teaching & Learning Activities

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

Assessment Methods and Weighting

Methods | Details | Weighting in final course grade (%) | Assessment Methods to CLO Mapping
---|---|---|---

Department of Statistics & Actuarial Science

<table>
<thead>
<tr>
<th>Course Website</th>
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<td>moodle.hku.hk</td>
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**STAT3903**

**Stochastic models (6 credits)**

**Offering Department**: Statistics & Actuarial Science

**Course Co-ordinator**: Dr Y K Chung, Statistics & Actuarial Science (yukchung@hku.hk)

**Teachers Involved**: Dr Y K Chung, Statistics & Actuarial Science

**Course Objectives**: This is an introductory course in probability modelling. A range of important topics in stochastic processes will be discussed.

**Course Contents & Topics**: Introduction to probability theory, Conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of inter-arrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).

**Course Learning Outcomes**: On successful completion of this course, students should be able to:

- **CLO 1**: apply the conditioning method to calculate the mean and probability
- **CLO 2**: understand the essentials of Markov chains, the Poisson process, and Brownian motion
- **CLO 3**: understand how stochastic models can be applied to the study of real-life phenomena

**Pre-requisites**: Pass in STAT2901; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3603, or have already enrolled in this course; and For BSc(Actuarial Science) students only.


**Grade Descriptors (A+ to F)**

- **A**: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B**: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C**: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar situations. Apply moderately effective organizational and presentational skills.
- **D**: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
- **Fail**: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

**Course Type**: Lecture-based course

**Course Teaching & Learning Activities**

- **Activities**: Lectures (36), Tutorials (12), Reading / Self study (100)

**Assessment Methods and Weighting**

- **Methods**: Assignments (25), Coursework (assignments, tutorials, and a class test) 25, Examination (3-hour written examination) 75

**Required/recommended reading and online materials**: S. M. Ross: Introduction to Probability Models (9th edition)

**Course Website**: moodle.hku.hk

**STAT3904**

**Corporate finance for actuarial science (6 credits)**

**Offering Department**: Statistics & Actuarial Science

**Course Co-ordinator**: Dr J K Woo, Statistics & Actuarial Science (jkwoo@hku.hk)

**Teachers Involved**: Dr J K Woo, Statistics & Actuarial Science

**Course Objectives**: 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 & Topics**: The first part of the course will give an introduction to corporate finance and provide an overview of some topics covered in STAT2902 and STAT3615. These include: financial markets and companies; 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.

On successful completion of this course, students should be able to:
Course Learning Outcomes

CLO 1 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.

CLO 2 calculate the value of bonds and stocks.

CLO 3 assess financial performance using various measures.

CLO 4 understand the mean-variance portfolio theory.

Pre-requisites (and Co-requisites and Impermissible combinations)

(Pass in ACCT1101 and STAT2902) or (Pass in STAT3610 and STAT3615); and

Not for students who have passed in FINA1310, or have already enrolled in this course.

Offer in 2016 - 2017

Y 2nd sem Offer in 2017 - 2018: Y Examination May

Grade Descriptors (A+ to F)

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

B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

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Course Type

Lecture-based course

Course Teaching & Learning Activities

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Assessment Methods and Weighting

<table>
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<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75</td>
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Required/recommended reading and online materials


Course Website

moodle.hku.hk

STAT3905 Introduction to financial derivatives (6 credits)

Academic Year 2016

Offering Department Statistcs & Actuarial Science

Quota ---

Course Co-ordinator

Dr E C K Cheung, Statistics & Actuarial Science (eckc@hku.hk)

Teachers Involved

Dr E C K Cheung, Statistics & Actuarial Science

Course Objectives

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 & Topics

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.

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1 define and recognize the definitions of terms commonly used in derivatives markets

CLO 2 evaluate the payoff and profit of basic derivative contracts, including forwards, futures, options, and swaps

CLO 3 explain how derivative securities can be used as tools to manage financial risk

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT2902; and

Not for students who have passed in STAT3610, or have already enrolled in this course; and

Not for students who have passed in FINA2322, or have already enrolled in this course; and

For BSc(Actuarial Science) students only.

Offer in 2016 - 2017

Y 1st sem Offer in 2017 - 2018: Y Examination Dec

Grade Descriptors (A+ to F)

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

B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type

Lecture-based course

Course Teaching & Learning Activities

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Assessment Methods to CLO Mapping

CLO 1,2,3
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<td>Statistics &amp; Actuarial Science</td>
<td>Course Co-ordinator</td>
<td>Dr K C Cheung, Statistics &amp; Actuarial Science (<a href="mailto:kccg@hku.hk">kccg@hku.hk</a>)</td>
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<tr>
<td>Teachers Involved</td>
<td>Dr K C Cheung, Statistics &amp; Actuarial Science</td>
<td>Course Objectives</td>
<td>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.</td>
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<tr>
<td>Course Contents &amp; Topics</td>
<td>Severity models; frequency models; collective risk models; coverage modifications; ruin theory; risk measures; simulation.</td>
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<td>Course Objectives</td>
<td>On successful completion of this course, students should be able to:</td>
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<td>STAT3907</td>
<td>Linear models and forecasting (6 credits)</td>
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<tr>
<td>Offering Department</td>
<td>Statistics &amp; Actuarial Science</td>
<td>Course Co-ordinator</td>
<td>Dr G Li, Statistics &amp; Actuarial Science (<a href="mailto:gdli@hku.hk">gdli@hku.hk</a>)</td>
<td></td>
</tr>
<tr>
<td>Teachers Involved</td>
<td>Dr G Li, Statistics &amp; Actuarial Science</td>
<td>Course Objectives</td>
<td>This course deals with applied statistical methods of linear models and investigates various forecasting procedures through using linear models and time series analysis.</td>
<td></td>
</tr>
<tr>
<td>Course Contents &amp; Topics</td>
<td>Regression and multiple linear regression; predicting; generalised linear model; time series models including autoregressive, moving average, autoregressive-moving average and integrated models; forecasting.</td>
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<td>Course Learning Outcomes</td>
<td>On successful completion of this course, students should be able to:</td>
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<td>Pre-requisites (and Co-requisites and Impermissible combinations)</td>
<td>Pass in STAT2602 or STAT3902, or already enrolled in this course; and Not for students who have passed in STAT3600, or have already enrolled in this course; and Not for students who have passed in STAT4001, or have already enrolled in this course; and Not for students who have passed in ECON2280, or have already enrolled in this course; and For BSc(Actuarial Science) students only.</td>
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### STAT3908

**Credibility theory and loss distributions (6 credits)**

**Academic Year**: 2016

**Offering Department**: Statistics & Actuarial Science

**Quota**: ---

**Course Co-ordinator**: Dr K C Cheung, Statistics & Actuarial Science (kccg@hku.hk)

**Course Website**: moodle.hku.hk

**Course Objectives**
- Credibility is an example of a statistical estimate. The idea of credibility is very useful in premium calculation. Insurance loss varies according to the business nature, what distribution should be used to fit a particular loss is both of theoretical interest and practical importance. This course covers important actuarial and statistical methods.

**Course Contents & Topics**
- Limited fluctuation approach; Buhlman's approach; Bayesian approach; empirical Bayes parameter estimations; construction and selection of parametric models; properties and estimation of failure time and loss distributions, determination of the acceptability of a fitted model; comparison of fitted models; simulation of both discrete and continuous random variables.

**Course Learning Outcomes**
- On successful completion of this course, students should be able to:
  - CLO 1 apply limited fluctuation (classical) credibility including criteria for both full and partial credibility
  - CLO 2 perform Bayesian analysis using both discrete and continuous models
  - CLO 3 apply Buhlmann and Buhlmann-Straub models and understand the relationship of these to the Bayesian model
  - CLO 4 apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model
  - CLO 5 apply empirical Bayesian methods in the nonparametric and semiparametric cases
  - CLO 6 construct and select empirical models
  - CLO 7 determine the acceptability of a fitted model and/or compare models

**Pre-requisites (and Co-requisites and impermissible combinations)**
- Pass in STAT2602 or STAT3902 or STAT3906

**Offer in 2016 - 2017**

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<th>Grade Descriptors (A+ to F)</th>
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<th>Offer in 2017 - 2018</th>
<th>Examination</th>
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<td>75</td>
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**Pre-requisites**
### STAT3909

**Offering Department**
Statistics & Actuarial Science

**Course Co-ordinator**
Prof H L Yang, Statistics & Actuarial Science (hlyang@hku.hk)

**Course Objectives**
The objective of the course is to prepare students for the Non-traditional 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 & Topics**
This course is a continuation of the materials covered in STAT3901. 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.

**Course Learning Outcomes**
On successful completion of this course, students should be able to:
- CLO 1: calculate benefit reserves for life insurances and annuities
- CLO 2: incorporate expenses in gross premium and calculate policy value based on the gross premium for life insurances and annuities
- CLO 3: understand multiple decrement models and calculate the life insurances and annuities in models with multi-decrees
- CLO 4: understand the multiple state model and the Kolmogorov forward equations
- CLO 5: understand multiple life models and calculate the life insurances and annuities in multi-life models
- CLO 6: understand the interest risk and calculate the life insurances and annuities when the interest rate is not a constant, and understand profit testing

**Pre-requisites (and Co-requisites and Impermissible combinations)**
Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.

**Offer in 2016 - 2017**
Y 2nd sem  Offer in 2017 - 2018 : Y

**Grade Descriptors (A+ to F)**
- A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
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- 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.
- F: Fail

**Course Type**
Lecture-based course

**Grade & Learning Activities**

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**Required/recommended reading and online materials**

**Course Website**
moodle.hku.hk

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### STAT3910

**Offering Department**
Statistics & Actuarial Science

**Course Co-ordinator**
Prof H L Yang, Statistics & Actuarial Science (hlyang@hku.hk)

**Course Objectives**
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 STAT391I will cover all the concepts, principles and techniques needed for SoA Exam MFE.

**Course Contents & Topics**
Option market; 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.

**Course Learning Outcomes**
On successful completion of this course, students should be able to:
- CLO 1: calculate option price using binomial tree
- CLO 2: understand the risk neutral probability
- CLO 3: understand the discounted asset formula

**Course Website**
moodle.hku.hk
### Course Objectives

This course is an advanced course on the option pricing theory. The course covers Black-Scholes equation and stochastic calculus, and interest models. This course and STAT3910 will cover all the concepts, principles and techniques needed for SoA Exam MFE.

### Course Contents & Topics

Brownian motion; introduction to stochastic calculus; arithmetic and geometric Brownian motion; Ito formula; Sharpe ratio and risk premium; Black-Scholes equation; risk-neutral stock-price process and option pricing; option's elasticity and volatility; Vasicek, Cox-Ingersoll-Ross, and Black-Derman-Toy models; delta-hedging for bonds and the Sharpe-ratio equality constraint; Black's model; options on zero-coupon bonds; interest-rate caps and caplets.

### Course Learning Outcomes

On successful completion of this course, students should be able to:

1. **CLO 1** Understand Brownian motion and its properties
2. **CLO 2** Understand the Ito calculus and Ito formula
3. **CLO 3** Understand the Black-Scholes model and option pricing theory
4. **CLO 4** Understand the delta hedging and some basic risk management methods
5. **CLO 5** Understand some basic interest rate models

### Pre-requisites

Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910

### Offer in 2016 - 2017

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### Course Type

Lecture-based course

### Course Teaching & Learning Activities

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### Required/recommended reading and online materials

Robert L. McDonald: Derivatives Markets (2nd edition), Chapters 10-14
Lecture notes on conditional expectations and martingale

### Course Website

moodle.hku.hk

### 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.
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- **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.

### Required/Recommended Reading

- Robert L. McDonald: Derivatives Markets (2nd edition), Chapters 10-14
- Lecture notes on conditional expectations and martingale

### Course Website

moodle.hku.hk

### Course Details

#### STAT3911

**Financial economics II (6 credits)**

<table>
<thead>
<tr>
<th>Offering Department</th>
<th>Course Co-ordinator</th>
<th>Course Objectives</th>
<th>Course Contents &amp; Topics</th>
<th>Course Learning Outcomes</th>
<th>Pre-requisites (and Co-requisites and Impedible combinations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics &amp; Actuarial Science</td>
<td>Prof H L Yang, Statistics &amp; Actuarial Science (<a href="mailto:hlyang@hku.hk">hlyang@hku.hk</a>)</td>
<td>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 STAT3910 will cover all the concepts, principles and techniques needed for SoA Exam MFE.</td>
<td>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.</td>
<td>On successful completion of this course, students should be able to:</td>
<td>Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910</td>
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#### Grade Descriptors

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Department of Statistics & Actuarial Science

STAT3951 Investment and asset management (6 credits) Academic Year 2016

Offering Department Statistics & Actuarial Science
Course Co-ordinator Dr E C K Cheung, Statistics & Actuarial Science (eckc@hku.hk)
Teachers Involved Dr E C K Cheung, Statistics & Actuarial Science

Course Objectives
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.

Course Contents & Topics
- Complex financial instruments and their applications in investment management.
- Investment strategies and risk management.
- Performance evaluation and portfolio optimization techniques.

Course Learning Outcomes
- CLO 1 understand how to use multiple state models to evaluate expected cashflows dependent upon state transitions.
- CLO 2 understand the equity linked insurance products, and the method and idea of valuing the equity linked insurance products.
- CLO 3 understand the Esscher transform and its application to option pricing.
- CLO 4 value equity-linked death benefits.
- CLO 5 evaluate ruin probabilities in simple risk processes for non-life insurance.
- CLO 6 evaluate expected discounted dividends in simple risk processes with dividends.

Pre-requisites
Pass in STAT3909; or already enrolled in this course; and For BSc(Actuarial Science) students only.

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

Examination One 3-hour written examination 75 CLO 1,2,3,4,5,6

Assignments Coursework (assignments, tutorials, and a class test) 25 CLO 1,2,3,4,5,6
Examination One 3-hour written examination 75 CLO 1,2,3,4,5,6

Course Website moodle.hku.hk

STAT3952 Investment and asset management (6 credits) Academic Year 2016

Offering Department Statistics & Actuarial Science
Course Co-ordinator TBC, Statistics & Actuarial Science ()
Teachers Involved TBC, Statistics & Actuarial Science

Course Objectives
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 & Topics
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.

course grade (%) to CLO Mapping
Assignments Coursework (assignments, tutorials, and a class test) 25 CLO 1,2,3,4,5,6
Examination One 3-hour written examination 75 CLO 1,2,3,4,5,6

Required/recommended reading and online materials
CT5 Contingencies Core Technical Core Reading (Institute of Actuaries, 2010)
Lecture notes on equity linked insurance products and simple dividend-ruin models.

Course Website moodle.hku.hk

Department of Statistics & Actuarial Science
Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1 explain how an investment policy and an investment strategy can help manage risk
CLO 2 identify the obligations of a fiduciary in managing investment portfolios
CLO 3 describe how to select an investment strategy for an individual and the particular issues influencing investment strategies for institutional investors
CLO 4 explain principles of risk-based capital management
CLO 5 describe asset allocation strategies that can be used to construct an asset portfolio
CLO 6 identify and describe financial and non-financial risks faced by an entity
CLO 7 define risk metrics to quantify major types of risk exposure, apply AML principles to the establishment of investment policy and strategy
CLO 8 select or build a benchmark for a given portfolio or portfolio management style, describe and assess performance measurement methodologies for investment portfolios

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT3901; and
Not for students who have passed in FINA2320, or have already enrolled in this course; and
For BSc(Actuarial Science) students only.

Offer in 2016 - 2017

N Offer in 2017 - 2018 : N
Examination ---

Grade Descriptors (A+ to F)

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

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Course Type

Lecture-based course

Course Teaching & Learning Activities

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

Assessment Methods and Weighting

Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping
Assignments Assignments, tutorials/example classes, group discussions, project and presentation 50 CLO 1,2,3,4,5,6,7,8
Examination One 2-hour written examination 50 CLO 1,2,3,4,5,6,7,8

Required/recommended reading and online materials

Crouhy, Galai, & Mark: Risk Management (2001)

Course Website

moodle.hku.hk

Additional Course Information


STAT3953

Fundamentals of actuarial practice (6 credits) Academic Year 2016

Offering Department Statistics & Actuarial Science Quota ---

Course Co-ordinator Dr L F K Ng, Statistics & Actuarial Science (flouisang@hku.hk)

Teachers Involved

Dr L F K Ng, Statistics & Actuarial Science

Course Objectives

This course teaches students about the business environment and exposes them to practical real-world situations using the actuarial control cycle as a framework.

Course Contents & Topics

This course provides an overview on selected materials relating to the following topics: Role of the Professional Actuary, External Forces, Risk in Actuarial Problems, Design and Pricing of Actuarial Solutions. Emphasis will be placed on applications to various financial security programmes including individual life insurance, group insurance, social security plans, retirement plans, investment funds and property & casualty insurance.

Course Learning Outcomes

On successful completion of this course, students should be able to:

CLO 1 provide introductory description of financial security systems, common actuarial techniques and practical experiences
CLO 2 describe actuarial practices, principles, approaches, methods, commonalities, problems and solutions
CLO 3 explain actuarial practices across the traditional areas of practice
CLO 4 explain actuarial practices as applied directly on behalf of financial security system providers or as a consultant to those providers
CLO 5 apply actuarial skills in nontraditional and emerging areas of practice
CLO 6 provide context for the specific mathematical and technical skills developed in the basic actuarial courses
CLO 7 prepare for the professional role as an Associate of the Society of Actuaries

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT3901; and
For BSc(Actuarial Science) students only.

Offer in 2016 - 2017 Y 1st sem Offer in 2017 - 2018 : Y Examination No Exam
## Grade Descriptors (A+ to F)

<table>
<thead>
<tr>
<th>Grade</th>
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<tbody>
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<td>Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.</td>
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<tr>
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<td>Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.</td>
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<td>Fail</td>
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### Course Type
Lecture-based course

### Course Teaching & Learning Activities

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<th>No. of Hours</th>
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<tr>
<td>Lectures</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Project work</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>oral presentation</td>
<td>25</td>
<td>CLO 4, 5, 6</td>
</tr>
<tr>
<td>Project reports</td>
<td>written report</td>
<td>50</td>
<td>CLO 4, 5, 6, 7</td>
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<tr>
<td>Test</td>
<td>in-class quizzes</td>
<td>25</td>
<td>CLO 1, 2, 3, 4, 5, 6, 7</td>
</tr>
</tbody>
</table>

### Required/recommended reading and online materials

- Klugman, S.: Understanding Actuarial Practice (Society of Actuaries, 2012)

### Course Website
moodle.hku.hk

### STAT3954
Current topics in actuarial science (6 credits)

### Offering Department
Statistics & Actuarial Science

### Course Co-ordinator
Prof W K Li, Statistics & Actuarial Science (hmtwk@hku.hk)

### Teachers Involved
TBC, Statistics & Actuarial Science

### Course Objectives
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 & Topics
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: This is the 7th year of the course and the full start of a new course structure echoing changes in the market for basic legal and general insurance skills for actuaries. Intellectually stimulating recent legal materials with heavy involvement of actuarial and other general insurance expertise would dominate the course, alongside with basic legal research skills and fundamental legal thinking. Sharing of experience from guests from the General Insurance Industry would also infiltrate the course.

### Course Learning Outcomes
On successful completion of this course, students should be able to:

- **CLO 1** have a basic understanding regarding Actuarial Control Cycle from A to Z for Life Insurance and General Insurance
- **CLO 2** possess some experience regarding fundamental actuarial practice through practical project
- **CLO 3** possess basic understanding of the legal system in Hong Kong
- **CLO 4** possess fundamental knowledge in certain core legal aspects such as the law of contract and the law of tort
- **CLO 5** possess fundamental knowledge of the law of insurance
- **CLO 6** conduct elementary legal researches when facing with legal problems
- **CLO 7** understand the basic elements of a routine judgment, the matrix of the facts and the law involved

### Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course; and For BSc(Actuarial Science) students only.

### Offer in 2016 - 2017
N Offer in 2017 - 2018: N

### Examination
Effective CLO Mapping
### Course Type
Lecture-based course

#### Course Teaching & Learning Activities

<table>
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<td>Tutorials</td>
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<tr>
<td>Reading / Self study</td>
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<td>100</td>
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<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, practical project &amp; class test(s))</td>
<td>100</td>
<td>CLO 1, 2, 3, 4, 5, 6, 7</td>
</tr>
</tbody>
</table>

#### Course Website
moodle.hku.hk

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**STAT3955**

### Survival analysis (6 credits)

**Academic Year:** 2016

**Offering Department:** Statistics & Actuarial Science

**Course Co-ordinator:** Dr J F Xu, Statistics & Actuarial Science (xujf@hku.hk)

**Teachers Involved:** Prof G Ma, Statistics & Actuarial Science (gma328@hku.hk)

**Course Objectives**

This course is concerned with how models which predict the survival pattern of humans or other entities are established. This exercise is sometimes referred to as survival-model construction.

**Course Contents & Topics**

The nature and properties of parametric and nonparametric survival models will be studied. Topics to be covered include: the introduction of some important basic quantities like the hazard function and survival function; some commonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation of the survival distribution by maximum likelihood estimation method; nonparametric estimation of the survival functions from possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; and the kernel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival functions by means of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional hazards regression model; and multivariate survival analysis.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- CLO 1 acquire a clear understanding of the nature of failure time data or survival data, a generalization of the concept of death and life
- CLO 2 perform estimation for some commonly used survival models under different types of censoring mechanisms
- CLO 3 analyze survival data using the Cox's semiparametric proportional hazards model
- CLO 4 extend the Cox's model to a multivariate setup to accommodate multivariate survival data

**Pre-requisites (and Co-requisites and Impermissible combinations)**

- Pass in STAT3902, or already enrolled in this course; or
- Pass in STAT3600 or STAT3901

**Offer in 2016 - 2017**

- Y 2nd sem Offer in 2017 - 2018 : Y

**Grading Criteria (A+ to F)**

- A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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- Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

**Course Type**

Lecture-based course

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<td>25</td>
<td>CLO 1, 2, 3, 4</td>
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<tr>
<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75</td>
<td>CLO 1, 2, 3, 4</td>
</tr>
</tbody>
</table>

**Required/recommended reading and online materials**


**Course Website**
moodle.hku.hk

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**STAT3956**

### Pension funds and pension mathematics (6 credits)

**Academic Year:** 2016

**Offering Department:** Statistics & Actuarial Science

**Course Co-ordinator:** Prof G Ma, Statistics & Actuarial Science (gma328@hku.hk)

**Teachers Involved:** Prof G Ma, Statistics & Actuarial Science (gma328@hku.hk)

**Course Objectives**

Demonstrate little or no evidence 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.

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**Course Type**

Lecture-based course

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<td>75</td>
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**Required/recommended reading and online materials**


**Course Website**
moodle.hku.hk
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. 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.

**Pre-requisites**
Pass in STAT3909

**Offer in 2016 - 2017**
Y 1st sem Offer in 2017 - 2018 : Y

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

**Required/recommended reading and online materials**
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**
moodle.hku.hk
## Course Information

**Course:** Credit risk analysis (6 credits)  
**Academic Year:** 2016  
**Offering Department:** Statistics & Actuarial Science  
**Course Co-ordinator:** Dr K P Wat, Statistics & Actuarial Science (watkp@hku.hk)  
**Course Website:** moodle.hku.hk

### Pre-requisites and Co-requisites
- Pass in STAT3600 or STAT3907

### Grade Descriptors (A+ to F)
- **A**: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B**: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C**: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
- **D**: Demonstrate partial but limited command of knowledge and skills for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
- **Fail**: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

### Course Type
- Lecture-based course

### Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

### Assessment Methods and Weighting

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<td>One 3-hour written examination</td>
<td>50</td>
<td>CLO 1,2,3,4,5</td>
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### Required/recommended reading and online materials
- Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)
- SAS Manuals on-line: Use the HELP button.

### Course Objectives

On successful completion of this course, students should be able to:

- **CLO 1**: Understand the Basel requirements for credit risk
- **CLO 2**: Estimate credit scores using the logit model
- **CLO 3**: Understand and estimate default probabilities using various approaches such as Moody's, the KMV and the mortality method
- **CLO 4**: Understand the concept of credit value-at-risk and the CreditMetrics approach
- **CLO 5**: Estimate default correlations
- **CLO 6**: Assess rating systems

### Course Contents & Topics
- Probabilities of default, recovery rates and loss given default; Default and credit migration; credit scoring and internal rating models; Credit portfolio models such as CreditMetrics, CreditPortfolioView, KMV and actuarial approach; Credit derivatives

### Course Learning Outcomes

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.

### Pre-requisites (and Co-requisites and impermissible combinations)
- Pass or already enrolled in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)
Course Teaching & Learning Activities

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<td>CLO 1,2,3,4,5,6</td>
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<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>60</td>
<td>CLO 1,2,3,4,5,6</td>
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</table>

Required/recommended reading and online materials


Course Website: moodle.hku.hk

STAT4608 Market risk analysis (6 credits)

Offering Department: Statistics & Actuarial Science
Course Co-ordinator: Dr Z Zhang, Statistics & Actuarial Science (zhang(z08@hku.hk)

Course Objectives

Dr Z Zhang, Statistics & Actuarial Science

Course Contents & Topics

Risk Measures; Value-at-Risk (VaR) models (parametric, Monte Carlo simulation and Historical simulation); Risk factor mapping; Advanced VaR models (GARCH-type models, extreme-value theory and normal-mixture); Principal Component Analysis and VaR; Backtesting and stress testing.

Course Learning Outcomes

On successful completion of this course, students should be able to:
1. CLO 1 understand VaR and expected shortfall as risk measures
2. CLO 2 compute VaR and expected shortfall
3. CLO 3 model volatility using GARCH-type models
4. CLO 4 understand extreme-value theory
5. CLO 5 understand backtesting and stress testing

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT3907 and STAT3910; or Pass in STAT4601 and (FINA2320 or STAT3609)

Offer in 2016 - 2017: Y

Pass in STAT4601 and (FINA2320 or STAT3609)

Grade Descriptors (A+ to F)

A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
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D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type: Lecture-based course

Assessment Methods and Weighting

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Course Website: moodle.hku.hk

STAT4711 Capstone experience for actuarial science undergraduates (6 credits)

Academic Year: 2016
The project-based course aims to provide students with capstone experience to formulate and investigate practical problems in actuarial science by integrating and applying actuarial theories and techniques learnt in their university years. It aims to help the students to establish a good and solid foundation of self-learning skills, and to enable students to equip with hands-on experience in solving practical problems including definition of the problem, designing the solution, and presentation of the results.

Topics acceptable for projects in this course can be related to any of the traditional actuarial areas of practice such as life insurance, pension, finance, investment, enterprise risk management and general insurance. Students are also encouraged to suggest topics in non-traditional actuarial areas provided they can find a suitable teacher and/or industry supervisor. All topics for this course will be subject to final approval by the Department to ensure relevance to actuarial science.

This project-based course aims to provide students with capstone experience to formulate and investigate practical problems in actuarial science by integrating and applying actuarial theories and techniques learnt in their university years. It aims to help the students to establish a good and solid foundation of self-learning skills, and to enable students to equip with hands-on experience in solving practical problems including definition of the problem, designing the solution, and presentation of the results.

Students will need to decide on the topic for a practical project, conduct market research regarding industry activities related to the topic, and make suggestion on a solution of the problem identified in their project.

On successful completion of this course, students should be able to:

- Define a practical problem, discuss the issues faced by different stakeholders, and design workable solutions for the problems.
- Integrate theoretical results and practical approaches, and to specify limitations of current developments.
- Deliver a practical results effectively in a written report and in oral presentations.
- Develop further logical, critical thinking, creativity, technical report writing, communication and consultation skills.
- Explain a non-actuarial audience the approaches of actuarial science to problems in a financial security system.

No formal teaching will be given for this course. Students are expected to devote 120-140 hours working on this project. Students will work in groups of four or five under the supervision of a teacher and/or an industry supervisor. Students are required to give a presentation on their work two to three weeks before the end of the semester, and submit their final report at the end of the semester.

On successful completion of this course, students should be able to:

- Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
- Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
- Demonstrate little or no evidence 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.

Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including (Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course); and

This capstone course is only for BSc(Actuarial Science) students, and is mutually exclusive with STAT4767 and STAT4798.

The earliest that a student is allowed to take this capstone course is the year 3 study.

Offer in 2016 - 2017

<table>
<thead>
<tr>
<th>Y</th>
<th>1st sem</th>
<th>2nd sem</th>
<th>Offer in 2017 - 2018</th>
<th>Examination</th>
<th>No Exam</th>
</tr>
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<tbody>
<tr>
<td>Y</td>
<td></td>
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Grade Descriptors (A+ to F)

- **A**: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B**: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C**: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
- **D**: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
- **F**: Demonstrate little or no evidence 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.

Pre-requisites and Co-requisites

Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3901; and

Assessment Methods and Weighting

- **Methods**
  - Oral presentation: 45% (CLO 1, 2, 3, 4, 5, 6)
  - Written report: 55% (CLO 1, 2, 3, 4, 5)

**Course Website**
moodle.hku.hk
and Impermissible combinations) This capstone course is only for BSc(Actuarial Science) students; and is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.

<table>
<thead>
<tr>
<th>Offer in 2016 - 2017 Grade Descriptors (Pass/Fail)</th>
<th>Y</th>
<th>1st sem</th>
<th>2nd sem Offer in 2017 - 2018:</th>
<th>Y</th>
<th>Examination</th>
<th>No Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Able to apply knowledge to solve problems in the workplace. Successfully handles and submits all work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of &quot;Distinction&quot;.</td>
<td></td>
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</tr>
<tr>
<td>Fail</td>
<td>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.</td>
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</tbody>
</table>

Course Type Internship

Course Teaching & Learning Activities Activities Internship work Details it is expected that students are to work at least 6 months or 120 working days No. of Hours 960

Assessment Methods and Weighting Methods Oral presentation Details oral presentation and in-class discussion Weighting in final course grade (%) 40 Assessment Methods to CLO Mapping CLO 1,2,3,4 Written report Details written report Weighting in final course grade (%) 60 Assessment Methods to CLO Mapping CLO 1,2,3,4

Course Website moodle.hku.hk

Additional Course Information Despite no weighting for this assessment component, the completion of the employer's evaluation form by the employer/direct supervisor is required for passing the course. Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are interested in enrolling in this course should contact the Department to obtain the approval. Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.

STAT4798 Statistics and actuarial science project (6 credits) Academic Year 2016

Offering Department Statistics & Actuarial Science Quota 50

Course Co-ordinator Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)

Teachers Involved Various teachers as the assessors of oral presentations and written reports, Statistics & Actuarial Science

Course Objectives Each year a few projects suitable for Actuarial Science students will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation. These projects, under the supervision of individual staff members, involve the applications of statistics and or probability in a wide range of problems of practical and or academic interests.

Course Contents & Topics

Course Learning Outcomes On successful completion of this course, students should be able to:

- CLO 1: formulate meaningful research problems
- CLO 2: learn and apply advanced techniques in probability and/or statistics to solve real life problems
- CLO 3: summarize and present research findings in a professional manner

Pre-requisites (and Co-requisites and Impermissible combinations) Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3902 and STAT3907; and Pass or already enrolled in at least one of the following courses: STAT3616, STAT3911, STAT4601, STAT4602; and

This capstone course is only for BSc(Actuarial Science) students; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4711.

The earliest that a student is allowed to take this capstone course is their year 3 study.

Offer in 2016 - 2017 Grade Descriptors (A+ to F)

<table>
<thead>
<tr>
<th>Offer in 2016 - 2017 Grade Descriptors (A+ to F)</th>
<th>A</th>
<th>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.)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>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.</td>
<td></td>
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</tr>
<tr>
<td>Fail</td>
<td>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.</td>
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Course Type Project-based course

Course Teaching & Learning Activities Activities Reading / Self study Details No. of Hours 120

Assessment Methods and Weighting Methods Oral presentation Details oral presentation & in-class discussion Weighting in final course grade (%) 40 Assessment Methods to CLO Mapping CLO 1,2,3 Research report Details written report Weighting in final course grade (%) 60 Assessment Methods to CLO Mapping CLO 1,2,3

Course Website moodle.hku.hk

Additional Course Information Approval is subject to past academic performance.
Course Objectives
On successful completion of this course, students should be able to:

CLO 1 understand utility theory including some commonly used utility functions, Jensen's inequality, risk aversion and utility maximization

CLO 2 define discrete and continuous ruin models

CLO 3 calculate the adjustment coefficient, Lundberg's inequality and Tijms approximation in ruin theory

CLO 4 understand the effect of reinsurance and change of parameters on ruin probability

CLO 5 understand non-homogeneous birth process and its applications as contagion models for claim frequencies

CLO 6 understand mixed Poisson process and its applications including the inflation model and the IBNR model

CLO 7 derive the relationship between stop-loss moments and equilibrium distributions

Pre-requisites
Pass in STAT3906 (and Co-requisites)

Offer in 2016 - 2017
Y 2nd sem Offer in 2017 - 2018 : Y

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

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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.

Assessment Methods and Weighting

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<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75</td>
<td>CLO 1,2,3,4,5,6</td>
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Course Website
moodle.hku.hk

Course Objectives
This course is an advanced course in actuarial science which discusses selected topics which potential graduate students will find useful. It focuses on tools that are in the frontier of actuarial science with examples on applications.

Course Contents & Topics
The contents will be chosen from the following topics:
Coherent risk measures; Premium calculation principles; Copulas; Extreme value theory; Stochastic dominance; Ordering of risks; Renewal equations with insurance applications; Reliability properties; Generalized linear models; Comonotonicity; Measures of dependency; Phase-type distributions; Applications to enterprise risk analysis; Other topics as determined by the instructor.

Course Learning Outcomes
On successful completion of this course, students should be able to:

CLO 1 understand the mathematical tools useful for further research and applications

CLO 2 apply the tools to solve potentially unseen problems

Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT3906

Offer in 2016 - 2017
N Offer in 2017 - 2018 : N
### Course Objectives

The purpose of this course is to develop knowledge of the basic techniques for ratemaking and estimating claim liabilities for general insurance. Application of the actuarial techniques to resolve general insurance problems will be emphasized. The course also provides general knowledge on the general insurance markets in Hong Kong and China. Students will acquire the fundamental concept on general insurance actuarial science together with the supporting calculations.

### Course Contents & Topics

1. General Insurance Markets in Hong Kong, Taiwan and PRC
   - Introduction of general insurance markets
   - Regulations on general insurance
2. Basic techniques for ratemaking
   - How to read and use manual rate pages
   - Ratemaking related to exposures
   - Ratemaking related to premiums
   - Ratemaking related to loss and loss adjustment expenses
   - Calculate the underwriting expense provisions
   - Pure premium methods
   - Loss Ratio methods
   - Rating differential and relativities
   - Considerations when selecting the final rates
3. Estimating claim liabilities
   - Data requirement
   - Build and analyze claim development triangles
   - Reserving techniques
   - Considerations when estimating the claim liabilities
   - Estimate recoveries and unpaid claim adjustment expenses
   - Appraise and validation of the estimated results
4. Concurrent topics Applications using predictive modeling in General Insurance
   - e.g. predictive modeling, Enterprise Risk Management, etc

### Course Learning Outcomes

On successful completion of this course, students should be able to:

- **CLO 1** understand the feature and underlying risk of general insurance products
- **CLO 2** calculate the premium rate for basic general insurance products
- **CLO 3** estimate the claims liabilities for general insurance products

### Pre-requisites

Pass in STAT3906

### Offer in 2016 - 2017

| Offer | Y | 2nd sem

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

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<td>CLO 1,2</td>
</tr>
<tr>
<td>Examination</td>
<td>60</td>
<td>CLO 1,2</td>
</tr>
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</table>

### Course Website

moodle.hku.hk

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### Academic Year

2016

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### Offer in 2017 - 2018

Y

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### Grade Descriptors (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

moodle.hku.hk

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### Required/recommended reading and online materials

### Course Type
Lecture-based course

<table>
<thead>
<tr>
<th>Activities</th>
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<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
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<td>36</td>
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<td>Tutorials</td>
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<tr>
<td>Reading / Self study</td>
<td></td>
<td>100</td>
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### Assessment Methods and Weights

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and a class test)</td>
<td>25</td>
<td>CLO 1, 2.3</td>
</tr>
<tr>
<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75</td>
<td>CLO 2.3</td>
</tr>
</tbody>
</table>

### Course Contents & Topics

- Contents may be selected from:
  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. Computationally-intensive methods: cross-validation; bootstrap; permutation methods.
  5. Robust methods: measures of robustness; M-estimator; L-estimator; R-estimator; estimating functions.
  6. Sequential analysis: sequential probability ratio test; sequential estimation.
  7. Density estimation; kernel methods.
  8. Other topics as determined by the instructor.

### Course Learning Outcomes

On successful completion of this course, students should be able to:
- CLO 1 comprehend the language and technicalities found in statistical research literature
- CLO 2 understand the use of standard mathematical tools for conducting statistical research
- CLO 3 apply a variety of research tools to solve standard statistical problems
- CLO 4 acquire exposure to some developments in contemporary statistical research

### Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT7609 or STAT3907

### Grade Descriptors (A+ to F)

- **A**: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B**: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C**: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
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- **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.
<table>
<thead>
<tr>
<th>Course Teaching &amp; Learning Activities</th>
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<th>Tutorials</th>
<th>Reading / Self study</th>
<th>36</th>
<th>12</th>
<th>100</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and a class test)</td>
<td>25</td>
<td>CLO 1,2,3,4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>75</td>
<td>CLO 1,2,3,4</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Course Website</td>
<td></td>
<td></td>
<td>moodle.hku.hk</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### STAT7610 Advanced probability (6 credits) Academic Year 2016

#### Offering Department
Statistics & Actuarial Science

#### Teachers Involved
Prof J J F Yao, Statistics & Actuarial Science (jeffyao@hku.hk)

#### Course Objectives
This course provides an introduction to measure theory and probability. The course will focus on some basic concepts in theoretical probability which are important for students to do research in actuarial science, probability and statistics.

#### Course Contents & Topics
- sigma-algebra, measurable space, measure and probability, measure space and probability space, measurable functions, random variables, integration theory, characteristic functions, convergence of random variables, Hilbert spaces, conditional expectation, martingales.

#### Course Learning Outcomes
On successful completion of this course, students should be able to:

- CLO 1 understand the fundamental measure theory and probability theory
- CLO 2 learn the general concept of integration, understand the monotone convergence theorem, Fatou's lemma and dominated convergence theorem
- CLO 3 understand the concept of conditional expectation
- CLO 4 have some elementary knowledge of martingale

#### Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT3603 or STAT3903

#### Offer in 2016 - 2017
Y 1st sem Offer in 2017 - 2018 : Y

#### Grade Descriptors (A+ to F)
- **A** Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B** Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C** Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
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- **Fail** Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

#### Course Type
Lecture-based course

#### Course Teaching & Learning Activities
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<tr>
<th>Activities</th>
<th>Details</th>
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#### Assessment Methods and Weighting
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<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and a class test)</td>
<td>50</td>
<td>CLO 1,2,3,4</td>
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<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>50</td>
<td>CLO 1,2,3,4</td>
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</tbody>
</table>

#### Required/recommended reading and online materials
moodle.hku.hk

### STAT7611 Computational statistics (6 credits) Academic Year 2016

#### Offering Department
Statistics & Actuarial Science

#### Teachers Involved
Prof G Yin, Statistics & Actuarial Science (gyin@hku.hk)

#### Course Objectives
This course aims to give undergraduate and postgraduate students in statistics a background in modern computationally-intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods.

#### Course Contents & Topics
- Contents include: 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.

On successful completion of this course, students should be able to:
Course Learning Outcomes

CLO 1 understand the importance of the technique for generating random variables in Bayesian statistics, Monte Carlo integration and bootstrapping methods
CLO 2 realize the advantages and disadvantages of the Newton-Raphson algorithm and the Fisher scoring algorithm and apply them to fit generalized linear models
CLO 3 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
CLO 4 apply EM-type algorithms to find the posterior mode and apply Markov chain Monte Carlo methods to generate posterior samples
CLO 5 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 STAT3600 or STAT3907

Offer in 2016 - 2017

Y 1st sem Offer in 2017 - 2018 : Y Examination Dec

Grade Descriptors (A+ to F)

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

Lecture-based course

Course Teaching & Learning Activities

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

Assessment Methods and Weighting

Methods | Details | Weighting in final course grade (%) | Assessment Methods to CLO Mapping
--- | --- | --- | ---
Assignments | Coursework (assignments, practical work, and a term test) | 50 | CLO 1,2,3,4,5
Examination | One 2-hour written examination | 50 | CLO 1,2,3,4,5

Required/recommended reading and online materials


Course Website

moodle.hku.hk

STAT7615 Advanced quantitative risk management and finance (6 credits)

Offering Department Statistics & Actuarial Science

Teachers Involved Prof W K Li, Statistics & Actuarial Science (hrntlk@hku.hk)

Course Objectives

This course covers statistical methods and models of importance to risk management and finance and links finance theory to market practice via statistical modeling and decision making. Emphases will be put on empirical analyses to address the discrepancy between finance theory and market data.

Course Contents & Topics

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; Stochastic interest rate models; Extreme value theory for risk management.

Course Learning Outcomes

On successful completion of this course, students should be able to:
CLO 1 apply Monte Carlo methods to determine the value of options and other derivative securities
CLO 2 predict volatility of a set of securities using appropriate models
CLO 3 estimate the value-at-risk under extreme value theory

Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT4608

Offer in 2016 - 2017

Y 2nd sem Offer in 2017 - 2018 : Y Examination May

Grade Descriptors (A+ to F)

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

Lecture-based course

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<tbody>
<tr>
<td>Danielsson Jon: Financial Risk Forecasting (Willy 2011)</td>
</tr>
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</table>

| Course Website | moodle.hku.hk |
Definitions

AS1 For the purpose of these regulations and the syllabuses for the degree of BSc in Actuarial Science, unless the context otherwise requires:

“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 in Actuarial Science degree

AS2 To be eligible for admission to the BSc in Actuarial Science 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

AS3 The curriculum for the BSc(ActuarSc) degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

Selection of courses

AS4 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.

1 This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.
Curriculum requirements and progression in curriculum

AS5

(a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.

(b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses, including 138 credits of the required courses as prescribed in the professional core of the BSc(ActuarSc) degree curriculum.

(c) 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.

(d) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under AS5(e).

(e) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.

(f) 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.

(g) 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 AS3, unless otherwise permitted by the Board of the Faculty.

Advanced standing

AS6 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

AS7

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

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

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

(d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.

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

Award of BSc in Actuarial Science Degree

AS8 To be eligible for the award of the BSc in Actuarial Science degree, candidates shall have:

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

(b) passed not fewer than 240 credits, comprising 138 credits of the required courses as prescribed in the professional core of the BSc(ActuarSc) degree curriculum.

Honours classification

AS9

(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(ActuarSc) 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:

<table>
<thead>
<tr>
<th>Class of honours</th>
<th>CGPA range</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class Honours</td>
<td>3.60 – 4.30</td>
</tr>
<tr>
<td>Second Class Honours</td>
<td>(2.40 – 3.59)</td>
</tr>
<tr>
<td>Division One</td>
<td>3.00 – 3.59</td>
</tr>
<tr>
<td>Division Two</td>
<td>2.40 – 2.99</td>
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<tr>
<td>Third Class Honours</td>
<td>1.70 – 2.39</td>
</tr>
<tr>
<td>Pass</td>
<td>1.00 – 1.69</td>
</tr>
</tbody>
</table>
(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(ActuarSc) may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.

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

See also General Regulations, pp. xx to xx

UG 1 Definitions:

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

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

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

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

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

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

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

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

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

‘Disciplinary elective course’ or ‘Disciplinary Elective’ means any course offered in the same major or minor programme or the professional core which can be taken by candidates.

These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year ‘2012 curriculum’, the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSc&Sc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

(The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year ‘2012 curriculum’ can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)
to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

‘Elective course’ or ‘Elective’ means any course offered within the same or another curriculum, other than compulsory courses in the candidate’s degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

‘Capstone experience’ refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

‘Syllabus’ means courses taught by departments, centres, and schools, offered under a degree curriculum.

‘Prerequisite’ means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

‘Corequisite’ means a course which candidates must take in conjunction with the course in question.

‘Credits’ or ‘credit-units’ means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

‘Grade Points’ are standardized measurements of candidates’ academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

‘Grade Point Average’ is a numerical measure of a candidate’s academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The ‘Grade Point Average’ is the sum of these numerical values divided by the total number of credits attempted:

\[
GPA = \frac{\sum_{i} \text{Course Grade Point} \times \text{Course Credit Value}}{\sum_{i} \text{Course Credit Value}}
\]

(where ‘i’ stands for all passed and failed courses taken by the student over a specified period)

‘Semester Grade Point Average’ or ‘Semester GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

‘Year Grade Point Average’ or ‘Year GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

‘Cumulative Grade Point Average’ or ‘Cumulative GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

‘Assessment’ refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate, reference to ‘examination’ or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of ‘assessment’ and its related processes.

A ‘transcript’ refers to a transcript of the record of study of a candidate, issued by the Registry of the University.
UG 2 Advanced standing:

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

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

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

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

UG 3 Period of study:

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

UG 4 Progression in curriculum:

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

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

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

(d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total
credits normally required under the degree curricula of the candidates during their candidature at the University.

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

(i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
(ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
(iii) exceeded the maximum period of registration specified in the regulations of the degree.

UG 5 Requirements for graduation:

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

(a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English and 6 credits in an English in the Discipline course;
(b) successful completion of 6 credits in Chinese language enhancement;
(c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
(d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

UG 6 Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

2 Candidates who have achieved Level 5** in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see Regulation UG6.

3 (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates’ home Faculty.

(b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates’ home Faculty.

(c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

4 Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see Regulation UG6.

5 Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.
UG 7 Assessment:

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

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

(c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.

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

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

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

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

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

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

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

UG 8 Grading system:

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standard</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Excellent</td>
<td>4.3</td>
</tr>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>Good</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Satisfactory</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>D+</td>
<td>Pass</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>Fail</td>
<td>0</td>
</tr>
</tbody>
</table>

UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.
(b) Special permission may be given by Senate for courses in individual curricula to be graded as ‘Pass’, ‘Fail’ or ‘Distinction’. Such courses will not be included in the calculation of the GPA.

**UG 9 Honours classifications:**

(a) Honours classifications shall be awarded in five divisions\(^7\): First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

<table>
<thead>
<tr>
<th>Class of honours</th>
<th>CGPA range</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class Honours</td>
<td>3.60 – 4.30</td>
</tr>
<tr>
<td>Second Class Honours</td>
<td>(2.40 – 3.59)</td>
</tr>
<tr>
<td>Division One</td>
<td>3.00 – 3.59</td>
</tr>
<tr>
<td>Division Two</td>
<td>2.40 – 2.99</td>
</tr>
<tr>
<td>Third Class Honours</td>
<td>1.70 – 2.39</td>
</tr>
<tr>
<td>Pass</td>
<td>1.00 – 1.69</td>
</tr>
</tbody>
</table>

(b) Honours classification may not be determined solely on the basis of a candidate’s Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.

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

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\(^7\) UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.
### Teaching Weeks 2016-2017 for Undergraduate and Taught Postgraduate Students

#### FIRST SEMESTER: SEP 1 - DEC 23, 2016

<table>
<thead>
<tr>
<th>Week</th>
<th>First Day of Teaching: Sep 1, 2016</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Reading/ Field Trip Week: Oct 17 - 22, 2016</td>
<td>7 (Reading)</td>
</tr>
<tr>
<td>8</td>
<td>Last Day of Teaching: Nov 30, 2016</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Revision Period: Dec 1 - 7, 2016</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>Assessment Period: Dec 8 - 23, 2016</td>
<td>13</td>
</tr>
<tr>
<td>15</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Revision Period: May 1 - 6, 2017</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>Assessment Period: May 8 - 27, 2017</td>
<td>19</td>
</tr>
<tr>
<td>20</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Break</td>
<td></td>
</tr>
</tbody>
</table>

#### SECOND SEMESTER: JAN 16 - MAY 27, 2017

<table>
<thead>
<tr>
<th>Week</th>
<th>First Day of Teaching: Jan 16, 2017</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Class Suspension Period for the Lunar New Year: Jan 28 - Feb 3, 2017</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Reading/ Field Trip Week: Mar 6 - 11, 2017</td>
<td>5 (Reading)</td>
</tr>
<tr>
<td>6</td>
<td>Last Day of Teaching: Apr 29, 2017</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Revision Period: May 1 - 6, 2017</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Assessment Period: May 8 - 27, 2017</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Break</td>
<td></td>
</tr>
</tbody>
</table>

#### OPTIONAL SUMMER SEMESTER

| Week | Jun 26 - Aug 19, 2017 | 1 |

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### Notes:

- First Semester: 11 Mondays, 12 Tuesdays, Wednesdays and Thursdays, 11 Fridays and Saturdays
- Second Semester: 12 Mondays and Tuesdays, 13 Wednesdays, 12 Thursdays, 11.5 Fridays, and 12 Saturdays
### Useful contacts and websites

**Faculty of Science**  
Office Location: Ground Floor, Chong Yuet Ming Physics Building  
Tel: 3917 2683  
Fax: 2858 4620  
Email: science@hku.hk  
Website: [http://www.scifac.hku.hk](http://www.scifac.hku.hk)  
*(Please visit [http://www.scifac.hku.hk](http://www.scifac.hku.hk) for the latest updates of BSc courses, timetables, notices and forms)*

**Departments/School**

<table>
<thead>
<tr>
<th>Department</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences</td>
<td><a href="http://www.biosch.hku.hk">http://www.biosch.hku.hk</a></td>
</tr>
<tr>
<td>Biomedical Sciences</td>
<td><a href="http://www.sbms.hku.hk">http://www.sbms.hku.hk</a></td>
</tr>
<tr>
<td>Chemistry</td>
<td><a href="http://www.chemistry.hku.hk">http://www.chemistry.hku.hk</a></td>
</tr>
<tr>
<td>Earth Sciences</td>
<td><a href="http://www.earthsciences.hku.hk">http://www.earthsciences.hku.hk</a></td>
</tr>
</tbody>
</table>

**Academic Advising Office**  
Tel: 2219 4686  
Website: [http://aao.hku.hk](http://aao.hku.hk)

**Academic Services Office**  
Office Location: G04, Run Run Shaw Building  
Tel: 2859 2433  
Fax: 2540 1405  
Email: asoffice@hku.hk  
Website: [http://www.ase.hku.hk](http://www.ase.hku.hk)

**Common Core courses**  
Website: [http://commoncore.hku.hk](http://commoncore.hku.hk)

**HKU Worldwide Undergraduate Exchange Programme**  
Website: [http://www.als.hku.hk/admission/exchange](http://www.als.hku.hk/admission/exchange)

**Centre of Development and Resources for Students (CEDARS)**  
Tel: 2859 2305  
Website: [http://cedars.hku.hk](http://cedars.hku.hk)

**University Health Service**  
Tel: 2859 2501 (General enquiries)  
2549 4686 (Medical appointments only)  
Website: [http://www.uhs.hku.hk](http://www.uhs.hku.hk)

**Plagiarism**  
Website: [http://www.hku.hk/plagiarism](http://www.hku.hk/plagiarism)