STAT3037/6043
Life Contingencies

Course Description
This course develops actuarial techniques for the valuing of policies which depend on contingent events concerning uncertain lifetimes. Topics include principal forms of heterogeneity within a population and the ways in which selection can occur; definition of simple assurance and annuity contracts; development of formulae for means and variances of the present values of payments; evaluating expected values and variances of simple insurance and annuity contracts; description and calculation of net and gross premiums and provisions for various insurance contracts; and cash flow models and profit tests, extended to multiple decrements and multiple state models.

Semester and Year | Semester 2 2014
Course URL | http://programsandcourses.anu.edu.au/course/STAT3037
Mode of Delivery | On campus
Prerequisites | STAT2001 Introductory Mathematical Statistics and STAT2032 Financial Mathematics
Course Convener | Aaron Bruhn
Office Location: | CBE 4.45
Phone: | (02) 6125-4904
Email: | aaron.bruhn@anu.edu.au
Consultation hours: | To be advised in week 2 of semester
Tutor(s) | To be advised on Course Wattle page
Student Administrators | Patricia Penm
| CBE building, Room 4.48

COURSE OVERVIEW

Course Learning Outcomes
Upon successful completion of the requirements for this course, students will achieve an understanding of and facility in:

- Mortality and selection.
- Life assurance contracts and life annuity contracts.
- Evaluation of assurances and annuities.
- Reserves and policy values.
- Mortality profit and extra risk.
- Increasing insurances and with-profit policies.
- Increasing annuities and applications of reserves.
- Multiple life functions and policies involving two or more lives.
- Cash flow models and profit testing
- Unit-linked policies
- Multiple decrement and multiple state models
Research-Led Teaching
The material covered in this course covers established principles in actuarial work and academia.

Student Feedback
All CBE courses are evaluated using Student Experience of Learning and Teaching (SELT) surveys, administered by Planning and Statistical Services at the ANU. These surveys are offered online, and students will be notified via email to their ANU address when surveys are available in each course. Feedback is used for course development so please take the time to respond thoughtfully. Course feedback is anonymous and provides the Colleges, University Education Committee and Academic Board with opportunities to recognise excellent teaching and to improve courses across the university. For more information on student surveys at ANU and reports on feedback provided on ANU courses, visit http://unistats.anu.edu.au/surveys/sekt/students/ and http://unistats.anu.edu.au/surveys/sekt/results/learning/

COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Summary of Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mortality and selection</td>
<td></td>
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<tr>
<td>2</td>
<td>Life assurance contracts</td>
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<tr>
<td>3</td>
<td>Life annuity contracts</td>
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<tr>
<td>4</td>
<td>Evaluation of assurances and annuities.</td>
<td></td>
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<td>5</td>
<td>Gross premium calculations and accumulations</td>
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<tr>
<td>6</td>
<td>Reserves and policy values</td>
<td>In-class Quiz</td>
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<tr>
<td>7</td>
<td>Policy values, mortality profit and extra risk</td>
<td></td>
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<tr>
<td>8</td>
<td>Increasing insurances and with-profit policies</td>
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</tr>
<tr>
<td>9</td>
<td>Increasing annuities and applications of reserves</td>
<td>Mid Semester Exam</td>
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<tr>
<td>10</td>
<td>Multiple life functions and policies</td>
<td></td>
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<tr>
<td>11</td>
<td>Cash flow models and profit testing</td>
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</tr>
<tr>
<td>12</td>
<td>Unit-linked policies</td>
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<tr>
<td>13</td>
<td>Multiple decrement and multiple state models</td>
<td></td>
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</tbody>
</table>
COURSE ASSESSMENT

<table>
<thead>
<tr>
<th>Item</th>
<th>Title</th>
<th>Value</th>
<th>Due Date</th>
<th>Linked Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In-class Quiz</td>
<td>10% (redeemable)</td>
<td>Monday 25 August</td>
<td>This covers all material up to and including what is covered in the lecture notes of weeks 1-4</td>
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<tr>
<td>2</td>
<td>Mid-Semester Exam</td>
<td>20% (redeemable)</td>
<td>In week 9 of lectures</td>
<td>This covers all material up to and including what is covered in the lecture notes of weeks 1-7</td>
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<tr>
<td>3</td>
<td>Final exam</td>
<td>70%, 80%, 90% or 100%</td>
<td></td>
<td>This covers all material in the course.</td>
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Assessment Task 1: In-class Quiz
Details of task:
This covers all material up to and including what is covered in the lecture notes of weeks 1-4. It will be held in the usual lecture time and place on Monday 12-1pm, in COP Lecture Theatre. Specific details regarding examination conditions will be provided once confirmed.

Assessment Task 1: Mid semester exam
Details of task:
This covers all material up to and including what is covered in the lecture notes of weeks 1-7. It will be held outside of lecture times, sometime in week 9. Specific details regarding examination conditions and the time and location for this examination will be provided once confirmed.

Assessment Task 1: Final exam
Details of task:
The final examination will be three hours long plus 15 minutes reading time and will cover the entire syllabus. It will count for at least 70% of your final grade. Specific details regarding examination conditions and the time and location for this examination will be provided once confirmed.

Overall raw mark for this course
There will be no special examinations for the mid-semester exam, nor for the in-class quiz. If you do not attempt one or both of these assessments, the weighting of each will be moved to the final exam. As both the quiz and the mid-semester are redeemable, your overall raw mark for this course will be based by the greater of the following:

- 100% final exam;
- 90% final exam plus 10% quiz;
- 80% final exam plus 20% mid-semester exam;
- 70% final exam plus 10% quiz plus 20% mid-semester exam.

Scaling
Your final mark for the course will be based on the raw marks allocated for each assignment or examination. However, your final mark may not be the same number as produced by that formula, as marks may be scaled. Any scaling applied will preserve the rank order of raw marks (i.e. if your raw mark exceeds that of another student, then your scaled mark will exceed or equal the scaled mark of that student), and may be either up or down.
**Exemption from Actuarial Professional examination**
The Australian National University is accredited by the Actuaries Institute (IAAust) to provide students with exemptions from the Part I professional examinations of the Institute. Exemptions are recommended subject to obtaining sufficiently high grades in designated courses.

This course provides for an exemption from the IAAust professional examination CT5. The standard for exemption is a Credit grade (60%) or higher.

**TEXTBOOK REQUIREMENTS**
It is essential for students to obtain a copy of the book *Formulae and Tables for Actuarial Examinations (2002)*. This book will be used as a reference in completing exercises throughout this course, and is required for all assessment items. It can be purchased through the University Co-op bookshop or ordered directly through ACTED Australia (website: www.acted.com.au)

All basic course materials will be available on the course website. This material includes lecture notes and tutorial exercises.

**TUTORIAL AND/OR SEMINAR REGISTRATION**
Tutorial and/or Seminar signup for this course will be done via the Wattle website. Detailed information about signup times will be provided on Wattle or during your first lecture. When tutorials are available for enrolment, follow these steps:

1. Log on to Wattle, and go to the course site.
2. Click on the link “Tutorial signup here”
3. On the right of the screen, click on the tab “Become Member of ……” for the tutorial class you wish to enter.
4. Confirm your choice

If you need to change your enrolment, you will be able to do so by clicking on the tab “Leave group...” and then re-enrol in another group. You will not be able to enrol in groups that have reached their maximum number. Please note that enrolment in ISIS must be finalised for you to have access to Wattle.

**COMMUNICATION**

**Email**
If necessary, the lecturer and tutors for this course will contact students on their official ANU student email address. Information about your enrolment and fees from theRegistrar and Student Services' office will also be sent to this email address.

**Announcements**
Students are expected to check the Wattle site for announcements about this course, e.g. changes to timetables or notifications of cancellations. Notifications of emergency cancellations of lectures or tutorials will be posted on the door of the relevant room.
Course URLs
More information about this course may be found on:

• Programs and Courses (http://programsandcourses.anu.edu.au/2014/Catalogue)

• the College of Business and Economics website (http://cbe.anu.edu/courses) and

• Wattle (https://wattle.anu.edu.au), the University's online learning environment. Log on to Wattle using your student number and your ISIS password.

University subscription to the Institute of Actuaries
The Institute of Actuaries of Australia (IAAust) allows students to become IAAust University Subscribers free of charge. Full time undergraduates studying at an Institute accredited university who are members of a university student actuarial society are eligible. To sign up, go to http://www.actuaries.asn.au/Membership/MembershipoftheInstitute/Subscriber.aspx

The University Subscriber offer is not a membership of the IAAust but a subscription to receive information on career opportunities, invitations to selected IAAust events and online publications. You might also consider joining the IAAust – there are advantages in doing so while a full-time student. For membership information, go to http://www.actuaries.asn.au/Membership/MembershipoftheInstitute.aspx.

General information for actuarial students
A generic Wattle site has been created for actuarial students called “Actuarial Students’ News and Information”. The purpose of this page is to provide actuarial students with up to date news on the actuarial profession, requirements for qualification, job opportunities and any other relevant information. To access it, log in to Wattle and in the “Search Courses” box at the top of the page search for “Actuarial”. Then find the link to the “Actuarial Students’ News and Information” page and click on it, selecting “Yes” to enrol in the course. You will remain enrolled in the site for the remainder of your degree at ANU.

POLICIES
The University offers a number of support services for students. Information on these is available online from http://students.anu.edu.au/studentlife/

ANU has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and implement them. You can find the University’s education policies and an explanatory glossary at: http://policies.anu.edu.au/

Students are expected to have read the Student Academic Integrity Policy before the commencement of their course.

Other key policies include:

• Student Assessment (Coursework)
• Student Surveys and Evaluations