Dear Students,

Welcome to ACTL3003 Insurance Risk Models. This course is one of eight courses for the BCom Actuarial major. At this stage in your study, you must have completed courses ACTL1001, ACTL2001, ACTL2002 and ACTL2003. These courses are part of the assumed knowledge for this course. If you are completing a combined BSc/BCom, then you must have completed the statistics/mathematics courses as part of the BSc in place of ACTL2002. If you are interested in working in the financial services industry, you may also wish to consider taking courses ACTL3002, ACTL3004, FINS3631 and FINS3640.

This course will provide you with the foundation on the classical and the modern theory of the actuarial mathematics, statistics, and models used in non-life insurance actuarial practice. In this course, you will learn how to value or price and how to reserve for non-life (or general) insurance products. I hope that you will find the course challenging and interesting.

In this course outline, you will find the details of the course requirements, course aims and learning outcomes, content, teaching methods, assessment tasks, texts and readings, and expectations. Please read it carefully and thoroughly, as it will be assumed that you are familiar with the contents.

If you have any questions about the course at any time then please contact me.

I look forward to guiding your learning through the duration of the course.

Sachi Purcal
1. Course Staff

The lecturer-in-charge for this course is:

<table>
<thead>
<tr>
<th>Staff</th>
<th>E-mail</th>
<th>Room</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Sachi Purcal</td>
<td><a href="mailto:s.purcal@unsw.edu.au">s.purcal@unsw.edu.au</a></td>
<td>Quad 2070</td>
<td>9385 3566</td>
</tr>
</tbody>
</table>

Sachi is responsible for the lectures and related teaching and learning, as well as the administration and final assessment of the course. He will also take one of the tutorial classes.

Your tutors for this course are:

<table>
<thead>
<tr>
<th>Staff</th>
<th>E-mail</th>
<th>Room</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rahul Nath</td>
<td><a href="mailto:z3160664@student.unsw.edu.au">z3160664@student.unsw.edu.au</a></td>
<td>Quad 2082A</td>
<td>9385 8005</td>
</tr>
<tr>
<td>Andrew Ngai</td>
<td><a href="mailto:andrew.ngai@unsw.edu.au">andrew.ngai@unsw.edu.au</a></td>
<td>Quad 2082A</td>
<td>9385 8005</td>
</tr>
</tbody>
</table>

These gentlemen are responsible for the tutorials and grading of quizzes and assignment assessment tasks.

1.1 Communication with Staff

Sachi will normally be available for consultation on Wednesdays during teaching session from 1400 to 1600 in Quad 2070. For other times, appointments should usually be made in advance using email.

Andrew and Rahul will be available for consultation in room Quad 2082A. Times will be posted on the course web site, but at the time of printing Andrew's consultation time is Thursday 1500 to 1600 and Rahul's consultation time is Wednesday 1200 to 1300.

If students have questions about the material covered in lectures then consult the lecturer-in-charge. For tutorial problems or other problems with assignments and course material students should consult their tutor. For administrative matters related to the course including enrolment, tutorial enrolment, assessment, special consideration, and the course web site, students should consult the lecturer-in-charge or the School Administrator (Bindya Subba).

All non-academic queries should be addressed to:

Bindya Subba  Actuarial Studies Office  Room 2058, 2nd Floor Quadrangle Building  Telephone: 9385 1886  Fax: 9385 1883  E-mail: b.subba@unsw.edu.au
2. INFORMATION ABOUT THE COURSE

2.1 Teaching times and Locations
This course consists of a 3 hour lecture and a 1 hour tutorial per week. For the 12 weeks of the session, this is a total of 48 hours of contact teaching.

The lectures are held on

- Tuesdays 4:00 p.m. – 6:00 p.m. Mathews B
- Friday 1:00 p.m. – 2:00 p.m. Mathews B

Timetables and locations are correct at time of printing. A full timetable of lectures and topics is provided later in this Course study guide. Any alterations to the lecture times or locations will be advised in lectures and via the Course WebCT Vista site.

Students should consult the WebCT Vista site on a regular basis, since assignment questions and other Course materials will be placed there. The web address is http://vista.elearning.unsw.edu.au.

Tutorials
Tutorials commence in Week 1.

3004 Tue 2:00 p.m. – 3:00 p.m. QUAD G046
3005 Tue 3:00 p.m. – 4:00 p.m. QUAD 1047
3007 Fri 11:00 a.m. – 12:00 m. QUAD 1048
3008 Fri 2:00 p.m. – 3:00 p.m. QUAD G047

Students must attend the tutorial for which they are enrolled. Attendance will be recorded and count towards meeting the requirements to pass the course. If you wish to change your tutorial then you must lodge an application to change your tutorial time with the Actuarial Studies office.

In tutorials, we will implement interactive learning where participation is highly encouraged. To get the most out of the tutorials, students should read lecture notes and textbooks and references and complete assigned homework problems in advance of the tutorial.

2.2 Units of Credit
6

2.3 Parallel teaching in the course
Students enrolled in ACTL3003 must attend the undergraduate lectures. Students attending ACTL5106 must be enrolled in the Master of Actuarial Studies. Faculty and School policy does not allow undergraduate attendance at postgraduate lectures and vice versa.
2.4 Relationship of this course to other course offerings
This course covers the mathematical foundations of non-life insurance risk modelling. The assumed knowledge for this course is a good foundation of ACTL1001, ACTL2001, ACTL2002 and ACTL2003. Students enrolled in the combined BSc/BCom program must have completed the statistics/mathematics courses in place of ACTL2002. Consult the Course Coordinator if you do not have the required background.

Students should have a solid background in mathematics and exposure to fundamental concepts in probability and statistics, and are assumed to be able to use a computer to analyse financial and/or statistics problems. You should be able to use a word processing package (such as WORD) and a spreadsheet (such as EXCEL). Students could use whatever computer programs they are most familiar with in doing assignments and other assigned tasks.

3. COURSE AIMS AND OUTCOMES

3.1 Course Aims

Course Description
This course will cover both the classical and the modern theory of the actuarial mathematics, statistics, and models used in non-life insurance actuarial practice. Topics covered include: basic concepts of utility theory and insurance; loss distributions and reinsurance; Bayesian statistical models; risk models including individual and collective risk models (e.g. Compound Poisson); estimation of aggregate claims distribution; probability of ruin; premium rating and credibility; experience rating systems; claims reserving for loss run-off data (IBNR techniques); use of generalised linear models; and decision theory. The course will also cover No Claim Discount (or bonus-malus) schemes.

This course corresponds largely with the actuarial professional subject CT6 Statistical Methods. ACTL2003 covers several topics from this subject as well. Students achieving an average of 65% or higher according to the following formula will be recommended for exemption from the professional examination:

\[
\text{1/3 of ACTL2003 grade plus 2/3 of ACTL3003 grade.}
\]

Exemptions from professional actuarial examinations require above average performance in the equivalent University course.

Course Aim
The primary aim of this course is to provide students with an understanding of:

- The mathematical concepts and techniques that are used to model and value non-life insurance products.
Course Aims/Student Learning Outcomes of the Institute of Actuaries CT6 syllabus

1. Explain the concepts of decision theory and apply them.
2. Calculate probabilities and moments of loss distribution both with and without limits and risk-sharing arrangements.
3. Construct risk models involving frequency and severity distributions and calculate the moment generating function and the moments for the risk models both with and without simple reinsurance arrangements.
4. Explain the concept of ruin for a risk model.
5. Explain the fundamental concepts of Bayesian statistics and use these concepts to calculate Bayesian estimators.
6. Describe the fundamental concepts of rating and apply them to simple experience rating systems.
7. Describe and apply techniques for analysing a delay (or run-off) triangle and projecting the ultimate position.
8. Explain the fundamental concepts of a generalised linear model (GLM), and describe how a GLM may apply.
9. [Define and apply the main concepts underlying the analysis of time series models.]
10. [Explain the concepts of “Monte Carlo” simulation using a series of pseudo-random numbers.]

Note that topics 9 and 10 are covered in ACTL2003, and not in ACTL3003.

3.2 Student Learning Outcomes
At the end of this course students should have:

1. Developed an understanding of the fundamental techniques used to value cash flows associated with contingent events in non-life or general insurance.
2. Developed an ability to assess the risks inherent in cash flows resulting from these contingent events.
3. Developed an understanding of the general insurance products that may be available in the market.
4. Developed an understanding of the basic valuation of reinsuring these general insurance products.
5. Enhanced their skills of integrating these contingent valuation concepts and their application to practical situations.
6. Developed the ability to assess calculations of premiums and policy values of these insurance and reinsurance products for reasonableness.
7. Developed an ability to apply these technical skills to practical valuation problems in the life insurance and reinsurance markets.
8. Developed basic discussion skills for explaining general insurance and reinsurance problems in simple terms.
3.3 Approach to learning and teaching
The course textbooks, readings, lectures and assessment tasks are designed to provide a framework for your learning. Every student has a different approach to learning. How much time you spend on reading in preparation for lectures, completing assessment tasks, reviewing course objectives, deepening your understanding and preparing for final examinations will depend on your learning approach. Lectures will generally cover the main concepts and issues and will not necessarily cover all the details of the course readings or texts. It is expected that you have read the reading material for the lecture in advance. Students who are successful in this course take an active approach to learning.

3.4 Teaching Strategies
The course involves three key components – the lecture, the tutorial and your private study.

Each lecture will provide a short overview of topic at hand and will then focus on explaining the difficult concepts and issues. The role of the lecture is to help you understand the context of the topic as well as work through the difficult points.

Each tutorial will involve a number of exercises that relate to the current week’s topic. You are required to prepare for each tutorial and the tutorial will require your participation. The exercises to be covered in each tutorial are available on WebCT. The role of the tutorial is to help build your understanding of the topic through the application of what you have learnt to a variety of different problems. They also give you the opportunity to discuss your work with your colleagues, and hence gain an indication of your own progress.

Your private study is the most important component of this course. Weekly readings, tutorial exercises, solving problems from the text and your own topic summaries form the basis of an excellent private study regime. Keeping up to date is very important and each week builds on the prior weeks so it is important that you get your study regime organised quickly.

4. CONTINUAL COURSE EVALUATION AND IMPROVEMENT
Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW’s Course and Teaching Evaluation and Improvement (CATEI) Process is one of the ways in which student evaluative feedback is gathered. Student feedback is taken seriously, and continual improvements are made to the course based on such feedback. Significant changes to the course are communicated to students taking the course. Your input into improving future offerings of the course is highly valued.

As a result of previous evaluation of the course, there are planned improvements. Some students feel they want to get the most of the tutorial sessions and suggested to solve more difficult tutorial questions during these sessions. The students also feel to have more practical problems in the course offering. Regarding feedback, tutors will continue to be required to provide students with more feedback on assessment tasks. Students are also encouraged to come see either the tutors or lecturer during their consultation hours on a more regular basis. Students who are finding the materials covered in the course difficult should seek further assistance from the tutors and lecturer as well. The sooner the students seek for such assistance, the better prepared the tutors and lecturer can be to offer help. Students have asked for more worked examples, and these will be prepared for the 2008 offering.
5. **LEARNING ASSESSMENT**

5.1 **Formal Requirements**
In order to pass the course students must complete and submit all components of assessment on or before the due date. Late assessment submissions will not be marked. It is important that students be punctual and reliable when submitting assessments. This is an important workplace requirement and students need to ensure they meet deadlines.

The following table gives the relative weighting of the assessment components:

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Class Test 1</td>
<td>7.5%</td>
</tr>
<tr>
<td>Class Test 2</td>
<td>7.5%</td>
</tr>
<tr>
<td>Assignment</td>
<td>7.5%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>77.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

In order to pass the course student must perform satisfactorily in all course assessment components.

5.2 **Assessment Details**

**Quizzes**
Technical skills are important in practice and this course provides foundation technical skills that will be useful throughout your working life.

In order to assess your understanding of the technical skills covered in the course aims there will be two 50-minute quizzes tests during the session. Each test will be worth 7.5% of the total assessment for the course. Each quiz will be closed book. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations" into the tests.

Normal examination rules apply to the conduct of quizzes. Calculators will be allowed in the class tests and the final examination but a clear indication of all of the steps involved in your calculations must be shown. The university will not supply calculators to students for use in examinations where the provision of calculators has not been requested by the course examiner. It is the student’s responsibility to be familiar with the rules governing the conduct of examinations.

The dates for these tests are:

- **Class Quiz 1**  Monday, August 11 (week 3)  6:00 p.m.
- **Class Quiz 2**  Monday, September 8 (week 7)  6:00 p.m.
**Assignment**
The practical application of the course concepts based on actual data from insurance and financial markets is an important graduate attribute that employers require and this course aims to provide at least some introductory exposure to this. Writing skills for technical material are also important.

There will be one major assignment for this course involving the practical application of course concepts to an insurance market problem. This will provide students with an opportunity to also develop writing skills.

The assignment you submit must be your own work. The assignment will be assessed on both technical accuracy and practical application as well as how well it is written and the quality of the assignment presentation.

The assignment is due:
**Assignment** Friday, September 26 (week 9) 10:55 a.m.

**Final Examination**
The final examination will assess students understanding of the concepts covered in the entire course and their ability to apply them to practical problems.

The final examination will be a two-hour written paper. It will be a ‘closed book’ examination. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations" into the exam.

**5.3 Assignment Format**
The assignment will require written answers to a number of theoretical and practical problems. You may have to do some wider reading to solve the problems. The practical problems will require you to use a statistical package, like R.

**5.4 Assignment Submission Procedure**
Assignments must be placed in the box provided outside the rear door (Room 2059) near the Actuarial Studies Administrators Office (2nd floor, Quadrangle Building). A cover sheet must accompany these assignments. A copy of the cover sheet is available from the course WebCT site. Additional copies of the cover sheet can be obtained outside Quad 2059. Please note that it is School policy that late assignments will not be marked.

Remember to keep a copy of all work submitted for assessment and to keep returned marked assignments.

**5.5 Late Submission**
The School of Actuarial Studies has a policy of grading late assignments with a zero mark. Punctual submission of work is required in order to satisfy the requirements of the course. The assignment may be marked at the discretion of the course co-ordinator if there is a valid reason for late submission and used in cases where your final overall results are marginal.
5.6 Special Consideration and Supplementary examinations

UNSW policy and process for Special Consideration applies (check out the following https://my.unsw.edu.au/student/atoz/SpecialConsideration.html). Specifically:

- Applications for special consideration (including supplementary examinations) must go through UNSW Central administration (within 3 working days of the assessment to which it refers) – applications will not be accepted by teaching staff;
- Applying for special consideration does not automatically mean that you will be granted additional assessment or that you will be awarded an amended result;
- If you are making an application for special consideration (through UNSW Central Administration) please notify your Course Coordinator or Lecturer in Charge;
- Please note: a register of applications for Special Consideration is maintained. History of previous applications for Special Consideration is taken into account when considering each case.

Students who believe that their performance in this course, either during session or in an examination, has been adversely affected by sickness, misadventure or other circumstances beyond their control may apply for special consideration for affected assessments. See the University web site for more details: http://www.student.unsw.edu.au/atoz/atoz-Special.shtml

Students may be required to sit for an oral or written supplementary examination. Any supplementary examination date will be advised to students after the final examination. In general, a supplementary examination will only be offered to a student who has been prevented from taking the Final Examination, who has been placed at a serious disadvantage during the examination, and whose circumstances have improved considerably in the period since the relevant examination was held. Failure to attend a supplementary examination, if you have been granted one, will result in forfeiture of any additional assessment granted to you. Satisfactory performance in any course assessment is required in order to be granted a supplementary examination.

STUDENTS SHOULD NOTE THAT SPECIAL CONSIDERATION WILL NOT BE GRANTED UNLESS PERFORMANCE AND ATTENDANCE AT LECTURES IS SATISFACTORY. THIS WILL USUALLY MEAN THAT YOU WILL HAVE TO PASS ALL ASSESSMENT TASKS IN ORDER FOR ANY SPECIAL CONSIDERATION TO BE GIVEN.
ASB Policy and Process for Special Consideration and Supplementary Exams in Undergraduate Courses

In the ASB, requests for special consideration are determined by a Faculty-wide panel which will advise the Lecturer-in-Charge of appropriate action.

If the Faculty panel (see above) grants a special consideration request, this may entitle the student to sit a supplementary examination. In such cases the following procedures will apply:

- Supplementary exams will be scheduled centrally and will be held approximately two weeks after the formal examination period. Actual date will be advised by mid-semester.
- Where a student is granted a supplementary examination as a result of a request for special consideration, the student’s original exam (if completed) will not be marked and only the mark achieved in the supplementary examination will count towards the final grade.


Consideration for Missed Assessments (other than final examination)

If you miss a test or are unable to submit your assignment by the due time and date, and you have a valid reason, you need to inform the Actuarial Studies office as soon as possible. You must provide written documentation requesting consideration to the Actuarial Studies office, in the form of a letter explaining your reasons with evidence attached, i.e. medical certificate, police report etc. You should note the course details, your student ID and contact details in your letter as well. As per University rules these considerations must be submitted within 3 working days of the assessment date. If no request is received or it is received after 3 working days you will be awarded a zero mark for that assessment.

Review of Results of Assessments (other than final examination)

As per University rules, if you wish a piece of course assessment to be re-checked, for addition error or incorrect marking, you need to contact the Actuarial Studies office within 15 working days of the assessment being available for collection. You will need to bring in the assessment and provide a note as to the error or reason for review to the Actuarial Studies office. The assessment will be passed onto the relevant academic for review. Students will be able to collect back the assessment from the Actuarial Studies office.
6. ACADEMIC HONESTY, ACADEMIC MISCONDUCT AND PLAGIARISM

6.1 Academic Honesty and Plagiarism
The University regards plagiarism as a form of academic misconduct, and has very strict rules regarding plagiarism. For full information regarding policies, penalties and information to help you avoid plagiarism see:
http://www.lc.unsw.edu.au/plagiarism/index.html

Plagiarism is the presentation of the thoughts or work of another as one’s own.* Examples include:
- Direct duplication of the thoughts or work of another, including by copying work, or knowingly permitting it to be copied. This includes copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- Paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- Piecing together sections of the work of others into a new whole;
- Presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and,
- Claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty. It can be located at:
www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:
- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.
6.2 School of Actuarial Studies Policy on Plagiarism
The School of Actuarial Studies views any form of plagiarism as unacceptable. The School follows University Procedures in the event of any student plagiarism. In cases of plagiarism for in session assessment, the minimum penalty all students involved can expect to receive is a mark of zero for the particular assessment item. The Head of School will be informed, and the School will also keep a record of student Plagiarism cases. Students should familiarise themselves with the University Policy and Procedures and ensure they have consulted The Learning Centre web site so that they are aware of and understand the concepts and practices of academic honesty and plagiarism.

7. STUDENT RESPONSIBILITIES AND CONDUCT

7.1 Workload
It is expected that you will spend at least ten hours per week studying this course. This time should be made up of reading, working on tutorial exercises and additional problems, and attending classes. In periods where you need to complete assignments or prepare for examinations, the workload may be greater.

Over-commitment has been a cause of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

7.2 Attendance
Students are expected to be regular and punctual in attendance at all classes in the courses in which they are enrolled. University regulations indicate that if students attend less than eighty per cent of scheduled classes they may be refused final assessment.

7.3 General Conduct and Behaviour
You are expected to conduct yourself with consideration and respect for the needs of your fellow students and teaching staff. Conduct that unduly disrupts or interferes with a class, such as ringing or talking on mobile phones, is not acceptable and students may be asked to leave the class. More information on student conduct is available at http://www.my.unsw.edu.au.

7.4 Keeping informed
You should take note of all announcements made in lectures, tutorials or on the course web site. From time to time, the University will send important announcements to your university e-mail address without providing you with a paper copy. You will be deemed to have received this information. It is also your responsibility to keep the University informed of all changes to your contact details.

8. STUDENT RESOURCES

8.1 Course Resources
Textbooks
The main textbook for the course is:

Other References
The following reference also provides a detailed and comprehensive coverage of the topics covered in the Course. Besides, there are topics for CT6 that are not covered in Kaas, et al. For such topics, we suggest either

The Actuarial Education Company (ActEd), Course CT6 Course Notes, or


Some topics in the course are also covered in the following textbooks and the students may find the following references also helpful reading materials:


Formulae & Tables
Students will only be allowed to bring into the examinations for the Actuarial courses in the BCom the text "Formulae and Tables for Actuarial Examinations". This text must not be annotated. All students in the actuarial courses should purchase a copy of this text if they wish to use this in the final examinations for this course. The text is available from the UK Institute of Actuaries or from ActEd Australia. Visit the ActEd website at http://www.acted.com.au.

Software
This course will demonstrate many of its principles using the statistical language `R'. R is freely available at http://www.r-project.org/. The ASB Computing Labs also have other statistical software available, such as MINITAB, SAS and MATLAB (Statistics Toolbox), for use in this course. Excel can be used to carry out some of the assessment tasks in the course. Some of these packages are available at a student price from the UNSW bookshop.

Course WebCT
This course will use WebCT Vista for communication with students. The link therein to `The Admin Corner' (abbreviated as TAC) will prove invaluable.

The WebCT Vista site for this course will contain the course outline, lecture notes, homework and tutorial exercises, assessment information and any notices relevant to this course. It is important that you visit the site regularly to see any notices posted there by the course coordinator. The site can be accessed from the WebCT Vista log-in page at: http://vista.elearning.unsw.edu.au/.
8.2 Other Resources, Support and Information

The University and the ASB provide a wide range of support services for students, including:

Learning and Study Support:

- **ASB Education Development Unit**
  The Education Development Unit (EDU) provides learning support and assistance to all students in the ASB, to enable them to enhance the quality of their learning. The EDU services are free, and tailored to meet the academic needs of students in the Australian School of Business.

  The role of the EDU is to provide:
  
  - A range of support initiatives for students from the Australian School of Business in relation to their transition to university;
  - Learning skills development, resources and activities for Business students
  - Academic writing and skills workshops throughout the session;
  - Printed and online study skills resources, such as referencing guides, report writing and exam preparation;
  - A drop-in EDU Office containing books and resources that can be borrowed;
  - A limited consultation service for students with individual or small group learning needs.

  The EDU website [www.business.unsw.edu.au/edu](http://www.business.unsw.edu.au/edu) contains information, online resources and useful links as well as providing information and dates for workshops. More information about the EDU services including resources, workshop details and registration, and consultation request forms are available from the EDU Office.

  **EDU Contact Details**
  
  Location   Room GO7 Ground Floor,
  West Wing, Australian School of Business Building
  Telephone:  02 9385 5584
  Email:   Edu@unsw.edu.au
  Website:  [www.business.unsw.edu.au/edu](http://www.business.unsw.edu.au/edu)

- **UNSW Learning Centre** ([http://www.lc.unsw.edu.au](http://www.lc.unsw.edu.au))
  In addition to the EDU services, the UNSW Learning Centre provides academic skills support services for all UNSW students. The Learning Centre is located on Level 2 of the Library and can be contacted by phone: 9385 3890 or through their website.

  **Technical support:** For any technical support issues (difficulty logging in to websites, problems downloading documents, etc) you can contact the UNSW IT Service Desk at: (02) 9385 1333; Email: servicedesk@unsw.edu.au.
Counselling support - http://www.counselling.unsw.edu.au
Students experiencing problems of a personal or academic nature are encouraged to contact the Counselling Service at UNSW. This consultation service is free and confidential and run by professional counsellors. The Counselling Service also conducts workshops on topics such as ‘Coping With Stress’ and ‘Procrastination’. The Counselling Service is located on Level 2, Quadrangle East Wing, and can be contacted on 9385 5418.

Library training and support services - http://info.library.unsw.edu.au

Disability Support Services – Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the Course Coordinator or the Equity Officer (http://www.studentequity.unsw.edu.au/disabil.html). Early notification is essential to enable any necessary adjustments to be made.

In addition, it is important that all students are familiar with University policies and procedures in relation to such issues as:

- **Examination procedures** and advice concerning illness or misadventure

- **Occupational Health and Safety** policies and student responsibilities;
### 9. **COURSE SCHEDULE**

#### Brief outline

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Week Beginning</th>
<th>Topics Covered</th>
<th>Assignment/Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>28 July</td>
<td>Fitting distributions to insurance loss data: complete and incomplete data</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4 August</td>
<td>The Individual Risk Model</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>11 August</td>
<td>Collective Risk Models</td>
<td>Quiz 1 (August 11, Monday, 6 p.m.)</td>
</tr>
<tr>
<td>4</td>
<td>18 August</td>
<td>Collective Risk Models – continued</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>25 August</td>
<td>Ruin Theory</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1 September</td>
<td>Credibility Theory</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8 September</td>
<td>Credibility Theory - continued</td>
<td>Quiz 2 (September 8, Monday, 6 p.m.)</td>
</tr>
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<td>8</td>
<td>15 September</td>
<td>Generalised Linear Models</td>
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<td>9</td>
<td>22 September</td>
<td>Generalised Linear Models – continued</td>
<td>Assignment (due on September 26, Friday, 10:55 a.m.)</td>
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**University Recess**

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<thead>
<tr>
<th>Week Number</th>
<th>Week Beginning</th>
<th>Topics Covered</th>
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<tbody>
<tr>
<td>10</td>
<td>6 October</td>
<td>IBNR Techniques</td>
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<td>11</td>
<td>13 October</td>
<td>Decisions and Games</td>
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<tr>
<td>12</td>
<td>20 October</td>
<td>Revision</td>
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<td>Exam Period</td>
<td>27 October</td>
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Please note that changes to the timetable may occur and that any alterations will be advised in lectures or via the course web site. A more detailed lecture program is available in subsequent pages.
**Detailed Lecture Program**

Any changes will be advised through the WebCT Vista Course Website

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Topics and Reading</th>
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</table>
| 1    | **Tuesday 29 July** 4:00 p.m.–6:00 p.m. Mathews B | • Course introduction  
• Course administration; tutorials  
• Fitting loss models to data  
• Tools for measuring the quality of the fit of the models  
• Analysing data sets: complete and incomplete sets of observations |

**Reading**
Lecture notes  
Boland, Chapter 2  
Klugman, Panjer and Willmot, Chapters 12 and 13  

|  | **Friday 1 August** 1:00 p.m.–2:00p.m. Mathews B | **Topics**  
• Some real data sets analysed  
• Demonstration of R for fitting models to data |

**Reading**
Lecture notes  
Boland, Chapter 2  
Klugman, Panjer and Willmot, Chapters 12 and 13  

| 2 | **Tuesday 5 August** 4:00 p.m.–6:00 p.m. Mathews B | **Topics**  
• Introduction to the individual risk model  
• Deductibles and policy limits  
• Some commonly used parametric claim distributions – review of random variables, moments, generating functions  
• Introduction to convolutions |

**Reading**
Lecture notes  
Kaas, et al., Chapter 2  
Boland, Chapter 3 (Sections 3.1 to 3.3)
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<tr>
<th>Date</th>
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<th>Topics</th>
<th>Reading</th>
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</table>
| **Friday 8 August** | 1:00 p.m.–2:00 p.m. | Mathews B | • Approximation methods to distribution of sums of random variables  
• Applications in insurance and reinsurance | Lecture notes  
Kaas, et al., Chapter 2  
Boland, Chapter 3 (Sections 3.1 to 3.3) |
| **Monday 11 August** | 6 p.m.–7 p.m. | TBA      | **Quiz 1**  
Test coverage: Weeks 1 to 2 lectures |  |
| **Tuesday 12 August** | 4:00 p.m.–6:00 p.m. | Mathews B | **Topics**  
• Introduction to collective risk models  
• Models for claims frequency and claims severity | Lecture notes  
Kaas, et al., Chapter 3  
Boland, Chapter 3 (Sections 3.1 to 3.3) |
| **Friday 15 August** | 1:00 p.m.–2:00 p.m. | Mathews B | **Topics**  
• Aggregate sums and their distributions  
• Compound Poisson models | Lecture notes  
Kaas, et al., Chapter 3  
Boland, Chapter 3 (Sections 3.1 to 3.3) |
| **Tuesday 19 August** | 4:00 p.m.–6:00 p.m. | Mathews B | **Topics**  
• Collective risk models – continued  
• Panjer’s recursion formula | Lecture notes  
Kaas, et al., Chapter 3  
Boland, Chapter 3 (Sections 3.1 to 3.3) |
| **Friday 22 August** | 1:00 p.m.–2:00 p.m. | Mathews B | **Topics**  
• Approximating compound Poisson distributions  
• Relationship between individual and collective risk models | Lecture notes  
Kaas, et al., Chapter 3  
Boland, Chapter 3 (Sections 3.1 to 3.3) |
<table>
<thead>
<tr>
<th>Week</th>
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<th>Topics</th>
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<td>5</td>
<td>Tuesday 25 August</td>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Mathews B</td>
<td><strong>Topics</strong>&lt;br&gt;• The risk process&lt;br&gt;• Ruin probability&lt;br&gt;• Exponential/Lundberg bound and the case of exponential claims&lt;br&gt;• The adjustment coefficient&lt;br&gt;• Discrete time models</td>
<td><strong>Reading</strong>&lt;br&gt;Lecture notes&lt;br&gt;Kaas, et al., Chapter 4&lt;br&gt;Boland, Chapter 4</td>
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<td>Friday 29 August</td>
<td>1:00 p.m.–2:00 p.m.</td>
<td>Mathews B</td>
<td><strong>Topics</strong>&lt;br&gt;• Reinsurance and ruin probabilities</td>
<td><strong>Reading</strong>&lt;br&gt;Lecture notes&lt;br&gt;Kaas, et al., Chapter 4&lt;br&gt;Boland, Chapter 4</td>
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<td>6</td>
<td>Tuesday 2 September</td>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Mathews B</td>
<td><strong>Topics</strong>&lt;br&gt;• Introduction to credibility models&lt;br&gt;• Credibility factor – interpretation&lt;br&gt;• The balanced Bühlmann models&lt;br&gt;• The Bühlmann-Straub model</td>
<td><strong>Reading</strong>&lt;br&gt;Lecture notes&lt;br&gt;Kaas, et al., Chapter 7&lt;br&gt;Boland, Chapter 5</td>
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<td>Friday 5 September</td>
<td>1:00 p.m.–2:00 p.m.</td>
<td>Mathews B</td>
<td><strong>Topics</strong>&lt;br&gt;• Continuation of credibility models&lt;br&gt;• The Bayesian approach to credibility theory</td>
<td><strong>Reading</strong>&lt;br&gt;Lecture notes&lt;br&gt;ActEd CT6 Course Notes (chapter on credibility theory)&lt;br&gt;Kaas, et al., Chapter 7&lt;br&gt;Boland, Chapter 5</td>
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<td>7</td>
<td>Monday 8 September</td>
<td>6 p.m.–7 p.m.</td>
<td>TBA</td>
<td><strong>Quiz 2</strong>&lt;br&gt;Test coverage: Weeks 3 to 5 lectures</td>
<td><strong>Reading</strong>&lt;br&gt;Lecture notes&lt;br&gt;Kaas, et al., Chapter 7&lt;br&gt;Boland, Chapter 5</td>
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<td>Tuesday 9</td>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Mathews B</td>
<td>- Continuation of credibility models &lt;br&gt;- The empirical Bayes approach – similarities/differences with the Bayesian approach &lt;br&gt;- Deriving credibility premium formulas</td>
<td>Lecture notes&lt;br&gt;ActEd CT6 Course Notes (chapter on credibility theory)&lt;br&gt;Kaas, et al., Chapter 7&lt;br&gt;Boland, Chapter 5</td>
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<td>Friday 12</td>
<td>1:00 p.m.–2:00 p.m.</td>
<td>Mathews B</td>
<td>- No Claim Discount (NCD) or bonus-malus schemes &lt;br&gt;- Markov analysis</td>
<td>Lecture notes&lt;br&gt;Kaas, et al., Chapter 6&lt;br&gt;Boland, Chapter 6&lt;br&gt;ActEd CT6 Course Notes (chapter on experience rating systems)</td>
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<td>Tuesday 16</td>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Mathews B</td>
<td>- Introduction to Generalised Linear Models (GLMs) &lt;br&gt;- Components: stochastic, systematic, link function &lt;br&gt;- Exponential dispersion distributions &lt;br&gt;- Parameter estimation</td>
<td>Lecture notes&lt;br&gt;Boland, Chapter 7&lt;br&gt;ActEd CT6 Course Notes (chapter on GLMs)&lt;br&gt;Kaas, et al., Chapter 8</td>
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<td>Friday 19</td>
<td>1:00 p.m.–2:00 p.m.</td>
<td>Mathews B</td>
<td>- Linear predictors and the link function &lt;br&gt;- Deviance and the quality of the fit &lt;br&gt;- Exponential dispersion and their deviances</td>
<td>Lecture notes&lt;br&gt;Boland, Chapter 7&lt;br&gt;ActEd CT6 Course Notes (chapter on GLMs)&lt;br&gt;Kaas, et al., Chapter 8</td>
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<td>Tuesday 23</td>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Mathews B</td>
<td>- Some real data sets analysed—demonstration of R for fitting models to data</td>
<td>Lecture notes&lt;br&gt;Boland, Chapter 7&lt;br&gt;ActEd CT6 Course Notes (chapter on GLMs)&lt;br&gt;Kaas, et al., Chapter 8</td>
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<td>Friday 26 September</td>
<td>1:00 p.m.–2:00 p.m.</td>
<td>Mathews B</td>
<td>ASSIGNMENT DUE 26 September, 10:55 a.m.</td>
<td>Some real data sets analysed—demonstration of R for fitting models to data</td>
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<td>Kaas, et al., Chapter 8</td>
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<td>• Incurred but not reported (IBNR) reserves</td>
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<td>• Types of IBNR</td>
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<td>• Claims run-off triangle and modelling them</td>
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<td>• IBNR methods using GLMs</td>
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<td>11</td>
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<td>• Introduction to decision theory</td>
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<td>• Decision making under uncertainty</td>
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<td>• Games: decision theory in the face of conflict</td>
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<td>Friday 10 October</td>
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<td>• IBNR methods using GLMs</td>
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<td>• Some illustrations</td>
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<td>Friday 11 October</td>
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<td>• Zero-sum games, pure strategy, dominance, mixed strategies</td>
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Tuesday 15 October
4:00 p.m.–6:00 p.m.
Mathews B

Topics
• Revision

Friday 18 October
1:00 p.m.–2:00 p.m.
Mathews B

Topics
• Revision

EXAMINATION PERIOD 29 October to 14 November

*This timetable may be altered. Students will be advised of any changes in lectures and via the course web site.