



UNSW Business School

# School of Risk and Actuarial Studies

## **ACTL3151 Life Contingencies**

### **Course Outline Semester 1, 2017**

#### **Part A: Course-Specific Information**

Please consult Part B for key information on Business School policies (including those on plagiarism and special consideration), student responsibilities and student support services.

Dear Students,

Welcome to ACTL3151 Life Contingencies.

This course corresponds to the CT5 course of the Institute of Actuaries/Faculty of Actuaries.

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.

**The way the course is taught this year is different from traditional lecture. This teaching approach is often referred to as “flipped and blended”.**

The main rationale for this new structure is to bring the face-to-face time later in the learning process, when students are more comfortable with the materials, and more likely to interact and ask questions. In this flipped and blended approach, the first conceptual encounter with the materials of a given module happens in class through a learn-by-doing activity to spark the students’ interest in the topic and to provide a context for the subsequent video lectures. The second conceptual encounter with the materials happens at home when students watch video lectures. These video lectures are accompanied by Moodle forums which provide the students with an immediate opportunity for asking questions on their understanding of the material. Then, everyone gathers in the lecture room for a “lectorial”. The word combines *lectures*—because they are run by the lecturer, and with the whole group, and *tutorial*—because their goal is not to “lecture” students. By contrast, in this lectorial, the lecturer first provides a high level summary of the key concepts of the module and then moves on to other activities (such as discussions, advanced exercises, guest lectures, real life applications) that aim to cement students’ learning. Finally, the students move on to practicing their knowledge with tutorial exercises.

Please read this outline carefully and thoroughly, as it will be assumed that you are familiar with its contents.

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

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

Jinxia Zhu – Lecturer in charge

## Table of Contents

<b>PART A: COURSE-SPECIFIC INFORMATION</b>	<b>1</b>
<b><u>1 STAFF CONTACT DETAILS</u></b>	<b><u>1</u></b>
<b><u>2 COURSE DETAILS</u></b>	<b><u>1</u></b>
2.1 Teaching Times and Locations	1
2.2 Units of Credit	2
2.3 Summary of Course	2
2.4 Course Aims and Relationship to Other Courses	3
2.5 Student Learning Outcomes	3
<b><u>3 LEARNING AND TEACHING ACTIVITIES</u></b>	<b><u>6</u></b>
3.1 Approach to Learning and Teaching in the Course	6
3.2 Learning Activities and Teaching Strategies	7
<b><u>4 ASSESSMENT</u></b>	<b><u>7</u></b>
4.1 Formal Requirements	8
4.2 Assessment Details	8
4.3 Late Submission	11
<b><u>5 COURSE RESOURCES</u></b>	<b><u>11</u></b>
<b><u>6 COURSE EVALUATION AND DEVELOPMENT</u></b>	<b><u>12</u></b>
<b><u>7 COURSE SCHEDULE</u></b>	<b><u>14</u></b>

## PART A: COURSE-SPECIFIC INFORMATION

### 1 STAFF CONTACT DETAILS

The Course Co-ordinator and Lecturer-in-charge is Dr Jinxia Zhu. She is responsible for teaching and assessment of the course. Please find her contact details in the following table. Dr Zhu will hold weekly consultations. Her consultation times will be posted on the course Moodle web site.

Tutors for the course are Igor Balnozan, Carlos Cheng, Phuong Anh Vu and Devin Zhao. They are responsible for tutorials and grading of the mid-term exam and assignment tasks. Their contact information can be found in the table below. The tutors will hold consultation in the week before any in-session assessment. Their consultation times will also be posted on the course Moodle web site.

Position	Name	Email	Room	Phone
Lecturer-in-charge	Jinxia Zhu	<a href="mailto:Jinxia.zhu@unsw.edu.au">Jinxia.zhu@unsw.edu.au</a>	Business School Bldg 652	9385 7385
Tutor	Igor Balnozan	<a href="mailto:igor.balnozan@gmail.com">igor.balnozan@gmail.com</a>	N/A	
Tutor	Carlos Cheng	<a href="mailto:ccheng95@hotmail.com">ccheng95@hotmail.com</a>	N/A	
Tutor	Phuong Anh Vu	<a href="mailto:p.vu@unsw.edu.au">p.vu@unsw.edu.au</a>	N/A	
Tutor	Di Zhao	<a href="mailto:devin.zhao.hk@gmail.com">devin.zhao.hk@gmail.com</a>	N/A	

### 2 COURSE DETAILS

#### 2.1 Teaching Times and Locations

This course consists of

- Self-study video recordings available on the course Moodle website and organised in 10 modules;
- 1 hour lecture in week 1 and 2 hour lectures in weeks 2 to 12;
- 1 hour consultation every week; and
- 1 hour tutorial every week (2 to 13).

#### Lectorials

Lectorials will be held on **Monday 27 February from 1pm to 2pm** in week 1 in **ChemicalSc M17** and on **Wednesdays from 2pm to 4pm** in **Ritchie Theatre**, in weeks 2-12. You must remain available in all of those Monday and Wednesday slots for additional activities should they be organised, but you do not need to come unless we announce you have to do so.

#### Tutorials

Tutorials will be held from week 2 to week 13. Tutorials will cover topics that appear in the video recordings for the previous week. Scheduled Tutorial Session times and locations are as follows:

M09 A	Mon 9am	BUS 232	Carlos Cheng
M10 A	Mon 10am	BUS 232	Carlos Cheng
M11 A	Mon 11am	BUS 232	Phuong Anh Vu
M12 A	Mon 12pm	BUS 115	Phuong Anh Vu
W10 A	Wed 10am	BUS105	Phuong Anh Vu
H12 A	Thu 12pm	BUS 205	Igor Balnozan
H14 A	Thu 2pm	BUS 205	Igor Balnozan
H15 A	Thu 3pm	BUS 130	Di Zhao
H16 A	Thu 4pm	BUS 130	Di Zhao

Tutorials falling on Public Holidays will not be replaced. Students must attend the tutorial for which they are enrolled. Attendance will be recorded and counts towards the requirements to pass the course; for more information, see Part B of the Course Outline. If you wish to change your tutorial then you must lodge an application to change your tutorial time with the Student Centre..

Tutorials will involve interactive learning where participation is highly encouraged. To get the most out of the tutorials, students will need to ensure they cover the week's contents and complete assigned homework problems in advance of the tutorial.

Timetables and locations are correct at time of editing. A full timetable of lectorials and topics is provided later in this Course outline. Any alterations to the lectorial times or locations will be advised in lectures and via the Course website.

## 2.2 Units of Credit

The course is worth 6 units of credit.

There is no parallel teaching in this course.

## 2.3 Summary of Course

This course covers the actuarial mathematics and models for use in the analysis and actuarial management of life insurance and superannuation contracts. Topics include: the main forms of life insurance and annuity contracts; disability and long term care contracts and superannuation fund benefits; actuarial notation and the life table; moments of the value of the benefit payments; Thiele's differential equation for policy values; stochastic modelling of claims and benefit payments; gross premiums, net premiums, policy values and reserves; allowing for expenses and inflation; use of discounted emerging costs and profit tests; termination and alteration values; cost of guarantees; joint life functions.

This course covers material in the Subject CT5 Contingencies of the Institute of Actuaries.

## 2.4 Course Aims and Relationship to Other Courses

At the end of the course students should be able to:

- A. apply survival models to the pricing and valuation of life insurance and pension contracts
- B. apply multiple state models to the pricing and valuation of life insurance and pension contracts
- C. understands the main forms of insurance and pension contract and their actuarial aspects.

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 cash flows contingent on survival, death and other uncertain events.

This course covers the mathematical foundations of life insurance and superannuation models. The assumed knowledge for this course are the courses in the actuarial major including ACTL1101, ACTL2102, ACTL2111 and ACTL2131. Students enrolled in the combined Bachelor of Actuarial Studies / Bachelor of Science program should have completed the statistics/mathematics courses in place of ACTL2131. The course should normally be taken at the same time as ACTL3141 Actuarial Models and Statistics.

Students should have a solid background in mathematics 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).

## 2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items. These are:

1. Explain and apply the fundamental techniques used to value cash flows involving death, survival and other similar contingent events.
2. Assess risk inherent in cash flows resulting from these contingent events.
3. Describe the life insurance and life annuity products that may be available in the market.
4. Explain the basic valuation and funding of superannuation benefits.
5. State and apply contingent valuation concepts to practical situations.
6. Assess calculations of premiums and policy values of financial contingent products for reasonableness.
7. Integrate and apply these technical skills to practical valuation problems in the life insurance and annuity markets.
8. Present orally and explain Life insurance and superannuation problems in simple terms.
9. Participate collaboratively and responsibly in teams, and reflect on their own teamwork, and on the team's processes and ability to achieve outcomes

The course covers the following aims and syllabus items of the Institute of Actuaries courses: The course covers the syllabus of the Institute of Actuaries CT5 Contingencies examination. The following table indicates the learning outcomes of CT5 and the lectures in which they are covered.

CT5 Learning Objectives	Course Learning Outcomes
-------------------------	--------------------------

(i) Define simple assurance and annuity contracts, and develop formulae for the means and variances of the present values of the payments under these contracts, assuming constant deterministic interest.	3
(ii) Describe and use practical methods of evaluating expected values and variances of the simple contracts defined in objective (i).	6,7
(iii) Describe and calculate, using ultimate or select mortality, net premiums and net premium reserves of simple insurance contracts.	6,7
(iv) Describe and calculate, using ultimate or select mortality, net premiums and net premium reserves for increasing and decreasing benefits and annuities.	6,7
(v) Describe and calculate gross premiums and reserves of assurance and annuity contracts.	6,7
(vi) Define and use functions involving two lives.	1
(vii) Describe and illustrate methods of valuing cashflows that are contingent upon multiple transition events.	1,5
(viii) Describe and use methods of projecting and valuing expected cashflows that are contingent upon multiple decrement events.	1,4,5
(ix) Describe and use projected cashflow techniques, where and as appropriate for use in pricing, reserving, and assessing profitability.	2
(ix) Describe the principal forms of heterogeneity within a population and the ways in which selection can occur.	Covered in ACTL3141

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all undergraduate students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree (e.g. 'be an effective team player'). You demonstrate this by achieving specific Program Learning Outcomes - what you are able to DO by the end of your degree (e.g. 'participate collaboratively and responsibly in teams').

### Business Undergraduate Program Learning Goals and Outcomes

#### **1. Knowledge: Our graduates will have in-depth disciplinary knowledge applicable in local and global contexts.**

You should be able to select and apply disciplinary knowledge to business situations in a local and global environment.

#### **2. Critical thinking and problem solving: Our graduates will be critical thinkers and effective problem solvers.**

You should be able to identify and research issues in business situations, analyse the issues, and propose appropriate and well-justified solutions.

#### **3. Communication: Our graduates will be effective professional communicators.**

You should be able to:

- a. Prepare written documents that are clear and concise, using appropriate style and presentation for the intended audience, purpose and context, and

- b. Prepare and deliver oral presentations that are clear, focused, well-structured, and delivered in a professional manner.

**4. Teamwork: Our graduates will be effective team participants.**

You should be able to participate collaboratively and responsibly in teams, and reflect on your own teamwork, and on the team's processes and ability to achieve outcomes.

**5. Ethical, social and environmental responsibility: Our graduates will have a sound awareness of the ethical, social, cultural and environmental implications of business practice.**

You should be able to:

- a. Identify and assess ethical, environmental and/or sustainability considerations in business decision-making and practice, and
- b. Identify social and cultural implications of business situations.

For more information on the Undergraduate Program Learning Goals and Outcomes, see Part B of the course outline.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed (they may also be developed in tutorials and other activities):

Program Learning Goals and Outcomes		Course Learning Outcomes	Course Assessment Item
<i>This course helps you to achieve the following learning goals for all Business School undergraduate students:</i>		<i>On successful completion of the course, you should be able to:</i>	<i>This learning outcome will be assessed in the following items:</i>
1	Knowledge	Learning Outcomes 1-5	<ul style="list-style-type: none"> <li>• Tutorial Problems</li> <li>• Mid-session exam</li> <li>• Final Exam</li> </ul>
2	Critical thinking and problem solving	Learning Outcomes 5-7	<ul style="list-style-type: none"> <li>• Tutorial Problems</li> <li>• Mid-session exam</li> <li>• Final Exam</li> </ul>
3a	Written communication	Learning Outcomes 8	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Mid-session exam</li> <li>• Final exam</li> </ul>
3b	Oral communication	Learning Outcomes 8 - Communicate ideas in a succinct and clear manner.	<ul style="list-style-type: none"> <li>• Tutorial presentation and participation</li> </ul>
4	Teamwork	Learning Outcomes 9 - Work collaboratively to complete a task.	<ul style="list-style-type: none"> <li>• Group assignment</li> </ul>



5a.	Ethical, environmental and sustainability responsibility	Not specifically addressed in this course	<ul style="list-style-type: none"> <li>Not specifically assessed in this course</li> </ul>
5b.	Social and cultural awareness	Not specifically addressed in this course.	<ul style="list-style-type: none"> <li>Not specifically assessed in this course</li> </ul>

### 3 LEARNING AND TEACHING ACTIVITIES

#### 3.1 Approach to Learning and Teaching in the Course

The approach adopted in this course is one of assisted self-study. **The approach adopted in this course is called “flipped and blended” classroom.** While reading this subsection, please refer to the schedule given in Section 7.

The main rationale for this “flipped and blended” structure is twofold. First, it frees up class time which can now be used to do in-class exercises and learning-by-doing activities, which aim at enhancing students’ long-lasting (deep) learning. Second, it brings a significant portion of the face-to-face time later in the learning process, when students are more comfortable with the materials, and more likely to interact and ask questions.

**In this flipped and blended approach, the first conceptual encounter with the materials of a given module happens in class through a learn-by-doing activity to spark the students’ interest in the topic and to provide a context for the subsequent video lectures. The second conceptual encounter with the materials happens at home when students watch video lectures. These video lectures are accompanied by Moodle forums which provide the students with an immediate opportunity for asking questions on their understanding of the material. Consultation is also available. Then, everyone gathers in the lecture room for a “lectorial”. The word combines *lectures*—because they are run by the lecturer, and with the whole group, and *tutorial*—because their goal is not to “lecture” students. By contrast, in this lectional, the lecturer first provides a high level summary of the key concepts of the module and then moves on to other activities (such as discussions, advanced exercises, guest lectures, real life applications) that aim to cement students’ learning. Finally, the students move on to practicing their knowledge with tutorial exercises and computer exercises in R. Tutorial sessions aim to provide some additional face-to-face and personalised help.**

Course materials are organised in 10 modules. Students are responsible to learn topics with the following materials:

- Prescribed books (and recommended books for additional support)
- Video lectures available on the course web site
- Tutorial exercises with solutions
- Past quizzes and exams for advanced exercises

It is expected the students will take a pro-active approach to learning. It is recommended to have read all prescribed readings, watched the associated videos prior to the associated

module's lectorial and then attempted the tutorial exercises, in order to complete the module by the end of the lectorial.

It is expected that you will spend at least ten hours per week studying this course. In periods where you need to complete assignments or prepare for examinations, the workload may be greater. Over-commitment (to extra-curricular activities) 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. In the past, students have found the amount of contents particularly challenging. Don't allow yourself to fall behind the schedule!

### **3.2 Learning Activities and Teaching Strategies**

It is expected that the students will take a pro-active approach to learning. The course is organised in the following learning activities.

#### **Video lectures and Self-study**

During the time periods of self-study, students should cover the readings, video lectures and tutorials for the associated module. A required learning strategy for this course is to have read all prescribed readings and watched the associated video lectures before lectorials.

#### **Lectorials**

Lectorials are there to wrap up modules, to solve advanced exercises and to answer the students' questions. Students should have read the prescribed books and watched the videos prior to the lectorials. No course contents will be taught during the lectures. Students are encouraged to prepare questions and communicate them to the lecturer in advance (although this is not required).

#### **Tutorials**

The more you read the more you know, but the more you practice the more you learn and understand. So the key to the understanding of this course is problem solving. Tutorials are planned throughout the time allocated to a module's learning. Tutorials are for students to ask questions on aspects of the course that need further clarification and to interact with other students in the course. Students need to attempt the tutorial exercises prior to the tutorial classes and identify problems that require closer review during tutorials. They are an opportunity to learn from other students and to develop team skills by working on problems with other students.

The purpose of tutorials is to enable you to raise questions about difficult topics or problems encountered in their studies. *Students must not expect another lecture – they and their questions should drive what is discussed during a tutorial.*

A good learning strategy for the tutorials is:

- Prior to make an attempt of the exercises, review your lecture notes and videos.
- Prior to the tutorial, make an attempt to the exercises you should make before the tutorial (see Section 7: Course Schedule).
- During the tutorial, make an attempt to the exercises you should make in the tutorial (see Section 7: Course Schedule).
- After the tutorial, make an attempt to the exercises you should make after the tutorial (see Section 7: Course Schedule).
- If you have questions about the tutorial exercises, ask them to your tutor. If you think you have a good understanding of the material, you should try and answer the questions of your peers. This will give you feedback on your ability to explain the material and hence how well you know the material.
- Check your answer using the tutorial solution.

## 4 ASSESSMENT

### 4.1 Formal Requirements

In order to pass this course, you must:

- achieve a composite mark of at least 50; and
- make a satisfactory attempt at all assessment tasks (see below).

Students must complete and submit all components of assessment at or before the due times. It is important that students be punctual and reliable when submitting assessment. This is an important workplace requirement and students need to ensure they meet deadlines.

Your regular and punctual attendance at lectures and tutorials is expected in this course; see Part B of the Course Outline for details.

A professional CT5 exemption is achieved by a mark of 65% or higher in order to be recommended for exemptions. If you do not achieve this exemption grade, then you can still gain the exemption by successfully completing the Institute of Actuaries equivalent examination as soon as practical after the UNSW course.

### 4.2 Assessment Details

Assessment Task	Weighting	Length	Due Date
Tutorial Presentation	5%	Max 7 minutes	Advised on Moodle web site
Mid-Session Exam	15%	1 hour	Wednesday 29 March 2:15pm
Assignment	15%		As in schedule (see Section 7)
Final Exam	65%	2 hours	University Exam Period
Total	100%		

Feedback will be provided to students after their assessments.

### **Tutorial Presentation**

Communication skills is one of the most important graduate attributes that employers of commerce and actuarial graduates require. Students need to be able to explain complex financial concepts and problems in simple terms and to be able to explain why their answer is reasonable. Tutorial presentations will provide the students an opportunity to develop this skill.

During the session, students will be allocated a tutorial presentation. Each tutorial presentation consists of an oral presentation. Failure to appear on time for an oral presentation will result in a zero mark unless a satisfactory reason is given in writing to the Course Coordinator.

Marks will be assigned based on the presentation assessment criteria that are provided on the course website. Students should review this before their presentation.

### **Mid-term exam**

There will be one written answer mid-session exam in week 5 of 60 minutes duration. **The mid-term exam will take place on Wednesday 29 March 2017 from 2:15pm.** The location will be advised on the course website. The mid-session exam will be closed book. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations".

**Normal examination rules apply** to the conduct of mid-term exams. Calculators will be allowed in the mid-term and 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 course exams require written responses, with students earning marks for correct mathematical working as well as part marks for incorrect responses with correct method and reasoning. They test not only their knowledge of the material, but also the depth of their understanding of it.

### **Assignment**

The practical application of the course concepts based on actual financial market problems 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 Assignment for this course. The assignment will involve the practical application of course concepts to actuarial problems. The assignment will be a group assignment. Students will be assigned to a group within their tutorial classes. Each group will be required to submit an assignment report and each student will also need to complete a peer evaluation form to rate the other group members' contribution to the group work in his/her group and submit a Personal Reflection.

The assignment offers students the opportunity to engage in critical analysis, problem solving, team work and self-reflection, as well as to demonstrate their understanding of the concepts and perspectives that are central to actuarial studies. The assignment assists in the development of Program Learning Goals and Outcomes 1, 2, 3 and 4.

The assignment report will be assessed on technical accuracy, how well it is written, and the quality of the assignment presentation. The group process will be assessed by peer evaluation and personal reflection.

The assignment questions, together with the marks allocated to all components of the assignment, will be made available to students on the course website. A guide on effective teamwork will also be posted on the course website.

Students are reminded that the work they submit must be their own. This means that:

- The mathematical solutions you present are written up by you and your group members, without reference to any other group's work.
- The statistical analysis and mathematical calculation you present is done by your own group's programming code, which your group wrote and ran, without reference to any other group's work.
- Any spreadsheet solutions you present are from your own group's spreadsheets, which your group developed, without any reference to any other group's work.

Assignment reports must be submitted via the Turnitin submission box that is available on the course website. Turnitin reports on any similarities between their own cohort's assignments, and also with regard to other sources (such as the internet or all assignments submitted all around the world via Turnitin). More information is available at:

[http://elearning.unsw.edu.au/turnitin/content/TurnItIn\\_Student\\_Support.cfm?ss=0](http://elearning.unsw.edu.au/turnitin/content/TurnItIn_Student_Support.cfm?ss=0)

Please read this page, as we will assume that its content is familiar to you. You will be able to make multiple submissions and have access to the originality reports.

You need to check your document once it is submitted (check it on-screen). **We will not mark assignments that cannot be read on screen.**

Students are reminded of the risk that technical issues may delay or even prevent their submission (such as internet connection and/or computer breakdowns). Students should then consider either submitting their assignment from the university computer rooms or **allow enough time (at least 24 hours is recommended) between their submission and the due time.** The Turnitin module will not let you submit a late report. **No paper copy will be either accepted or graded.**

In case of a technical problem, the full document must be submitted to the course coordinator before the due time by e-mail, with explanations about why the student was not able to submit on time. In principle, this assignment will not be marked. It is only in exceptional circumstances where the assignment was submitted before the due time by e-mail that it may be marked—and this only if a valid reason is established.

### **Avoid a 0 for your assignment because of plagiarism**

Students are reminded that the work they submit must be their own. While we have no problem with students working together on the assignment problems, the material students submit for assessment must be their own. This means that:

- The mathematical solutions you present are written up by you and your group members, without reference to any other group's work.
- Any programming code you present are from your own computers, which you yourself and your group members developed, without any reference to any other group's work.

Students should make sure they understand what plagiarism is and to note that cases of plagiarism have a *very high* probability of being discovered. For issues of collective work, having different persons marking the assignment does *not* decrease this probability.

Students should keep a copy of all work submitted for assessment and keep their returned marked assignments.

This course is using the Review software for marking and feedback for part of the assignment. The Review login is <https://unsw.review-edu.com/unsw>

Information on accessing Review will be provided to students with further details of the assignment. You won't have access to Review until you are advised.

### 4.3 Late Submission

Please note that it is School policy that late submission of assignments will incur a penalty: a penalty of 25% of the mark the student would otherwise have obtained, for each full (or part) day of lateness (e.g., 0 day 1 minute = 25% penalty, 2 days 21 hours = 75% penalty).

Students who are late must submit their assignment to the LIC via e-mail. The LIC will then upload documents to the relevant submission boxes. The date and time of reception of the e-mail determines the submission time for the purposes of calculating the penalty.

### Final examination

The final examination will assess students understanding of the concepts covered in the course and readings and their ability to apply them to practical problems. The final examination will be a two hour written paper. The final examination will be closed book. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations" into the exam. This must not be annotated.

#### Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential.

## 5 COURSE RESOURCES

The **prescribed textbook** for the course is:

- D. C. M. Dickson, M. R. Hardy and H. R. Waters, 2<sup>nd</sup> edition, (2013), Actuarial Mathematics for Life Contingent Risks, Cambridge University Press [A solutions manual is available for purchase. The Solutions manual is strongly encouraged, as solutions to problems assigned from the textbook for tutorials will not be provided.]

Additional, **recommended references** are:

- *Life insurance mathematics*. Gerber, H. U. 3rd ed. Springer; Swiss Association of Actuaries, 1997. 217 pages
- *Actuarial mathematics*. Bowers, N. L.; Gerber, H. U.; Hickman, J. C. et al. 2nd ed. Society of Actuaries, 1997. 753 pages.
- *Core Reading for Subject CT5 Contingencies* published by The Institute of Actuaries.
- *ActEd Course Notes for Subject CT5 Contingencies*.

The course draws on and further develops concepts covered in ACTL2111 (Financial Mathematics) and ACTL2102 (Markov Chains). Students should review these concepts as required early in the course.



### Formulae & Tables

The only text students are allowed to bring into the examinations for the actuarial course is the text "Formulae and Tables for Actuarial Examinations". It must not be annotated. All students in the actuarial courses should purchase a copy of this text if they wish to use it in tutorials, mid-session exams and the final examinations. The text is available from the UNSW Bookstore, the UK Institute of Actuaries or from ActEd. Visit the ActEd website at <http://www.acted.co.uk/estore/>.

### Course website

The course Moodle website is available from the UNSW TELT platform:  
<http://elearning.unsw.edu.au/>

To access the Moodle online support site for students, follow the links from that website to UNSW Moodle Support/Support for Students. Additional technical support can be obtained from [itservicecentre@unsw.edu.au](mailto:itservicecentre@unsw.edu.au) (02 9385 1333). All course contents will be available from the course website (except for the module "Back to Basics" which is available on the ACTL all students website). **It is essential that you visit the site regularly (at least weekly) to see any notices posted there by the course coordinator.**

### The Actuaries Institute

The Actuaries Institute (AI) allows students to become AI 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 AI but a subscription to receive information on career opportunities, invitations to selected AI events and online publications. You might also consider joining the AI – there are advantages in doing so while a full-time student. For membership information, go to <http://www.actuaries.asn.au/Membership/MembershipoftheInstitute.aspx>

## 6 COURSE EVALUATION AND DEVELOPMENT

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. In this course we will seek feedback at least at the end of the session.

This year, the structure of the course and its learning and teaching strategy have changed radically. The main rationale for this change is the exceptional success of the lecture video recordings introduced in other courses, as well as the recurrent student request for additional coverage of exercises during contact hours. As the essentially unilateral lecturing is moved home with the help of video recordings, additional time is available during the lectures to work through exercises, wrap up topics, answer the residual questions students might have and invite guest lecturers

Furthermore, as a result of feedback from the past offering of the course, more time will be allocated to each presentation question according to the complexity of the question and 2 or more students will be allocated to present the solution to one question so the audience will benefit more from listening to the student presentation.

## 7 COURSE SCHEDULE

The course is organised according to the following model:

COURSE SCHEDULE			
Week	Self Study	Lectorials	Tutorials
Week 1 27 February	Life tables Module 1	Introduction	NO tutorials
Week 2 6 March	Module 2	Life tables Module 1	Module 1
Week 3 13 March	Module 3	Module 2	Module 2
Week 4 20 March	Module 4	Module 3	Module 3
Week 5 27 March	Module 4	Mid-session exam	Module 4
	<b>Mid-session exam: Wednesday 29 March 2:15pm</b>		
Week 6 03 April	Module 4 Module 5	Module 4	Module 4
Week 7 10 April	Module 6	Module 4 Module 5	Module 4 Module 5
Mid-semester break: Friday 14 – Saturday 22 April inclusive			
Week 8 24 April	Module 6 Module 7	Module 6	Module 6
Week 9 1 May	Module 8	Module 6 Module 7	Module 6 Module 7
	<b>Assignment Part (a) due: Sunday 7 May 5pm</b>		
Week 10 8 May	Module 9	Module 8	Module 8
Week 11 15 May	Module 10	Module 9	Module 9
	<b>Assignment Part (b) due: Thursday 18 May 4pm</b>		
Week 12 23 May		Module 10 Revision	Module 10
Week 13 30 May			Module 10



### *Self-study*

During the time periods indicated in pink, students should cover the readings, videos and tutorials for the associated module (details are given in the following pages).

### *Lectorials*

Lectorials will wrap up modules and provide an opportunity (during normal contact hours) to ask questions about the associated module. See Section 3.

### *Tutorials*

Tutorials provide support during the learning of the associated module. See Section 3.

This timetable may be altered. Students will be advised of any changes in lectures and via the course web site. Detailed information about the modules' contents and their associated readings is given in the following table.

Module	Topic	References
1	Life insurances benefits (single life)	Dickson et al. Chapters 1, 3 and 4
2	Life annuities (single life)	Dickson et al Chapter 5
3	Net Premium Valuation	Dickson et al Chapter 6
4	Premium Reserves and Policy Values	Dickson et al, Chapter 7
5	Gross Premiums and Reserves	Dickson et al, Chapter 6
6	Profit Testing	Dickson et al Chapters 12 and 13
7	Multiple Decrement Models	Dickson et al Chapter 8
8	Multiple state models	Dickson et al Chapter 8
9	Insurance and Annuities for Multiple Lives	Dickson et al Chapter 9
10	Pension funds	Dickson et al Chapter 10