

THE UNIVERSITY OF
NEW SOUTH WALES



**Australian School of Business
School of Actuarial Studies**

**ACTL3002
Life Insurance and Superannuation Models**

**COURSE OUTLINE
SEMESTER 1, 2009**

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Sydney 2052 Australia

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Dear Students,

Welcome to ACTL3002 Life Insurance and Superannuation 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 ACTL3003, ACTL3004, FINS3631 and FINS3640.

This course will provide you with the foundation on the mathematics of life insurance, life annuities and superannuation. In this course, you will learn how to value and how to reserve for life insurance and annuity products, as well as retirement benefits related to superannuation. We hope you 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 us.

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

Dr. Changki Kim

TABLE OF CONTENTS

<u>1. STAFF CONTACT DETAILS</u>	<u>1</u>
<u>2. COURSE DETAILS</u>	<u>1</u>
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	4
<u>3. LEARNING AND TEACHING ACTIVITIES</u>	<u>4</u>
3.1 Approach to Learning and Teaching in the Course	4
3.2 Learning Activities and Teaching Strategies	5
<u>4. ASSESSMENT</u>	<u>5</u>
4.1 Formal Requirements	5
4.2 Assessment Details	6
4.3 Assessment Format	8
4.4 Assignment Submission Procedure	8
4.5 Late Submission	8
<u>5. ACADEMIC HONESTY AND PLAGIARISM</u>	<u>8</u>
<u>6. COURSE RESOURCES</u>	<u>10</u>
<u>7. COURSE EVALUATION AND DEVELOPMENT</u>	<u>10</u>
<u>8. STUDENT RESPONSIBILITIES AND CONDUCT</u>	<u>11</u>
8.1 Workload	11
8.2 Attendance	11
8.3 Special Consideration and Supplementary Examinations	11
8.4 General Conduct and Behaviour	13
8.5 Occupational Health and Safety	13
8.6 Keeping Informed	13
<u>9. ADDITIONAL STUDENT RESOURCES AND SUPPORT</u>	<u>13</u>
<u>10. COURSE SCHEDULE</u>	<u>14</u>

1. STAFF CONTACT DETAILS

The Course Coordinator and Course Lecturer for this course is:

Staff	E-mail	Room	Telephone
Dr Changki Kim	c.kim@unsw.edu.au	Quad 2064	9385 2647

He is responsible for the lectures and related teaching and learning, as well as the administration and final assessment of the course.

The tutors for this course are:

Tutor	E-mail	Room	Telephone
Rahul Nath	z3160664@student.unsw.edu.au	Quad2082A	9385 8005
Weimin Xie	z3184621@student.unsw.edu.au	Quad2082A	9385 8005

Tutors are responsible for the tutorials and grading of Class Tests and assignment assessment tasks.

Communication with Staff

Changki will normally be available for consultation on Mondays during teaching session from 3:00pm to 4:30pm in Quad 2064. For other times, appointments should normally be made in advance using email.

Rahul and Weimin will also be available for consultation at the tutors' office in Quad 2082A. Times will be posted on the web site.

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

All non-academic queries should be addressed to:

Bindya Subba
Actuarial Studies Office
Quad 2058
Telephone: 9385 1886
Fax: 9385 1883
Email: b.subba@unsw.edu.au

2. COURSE DETAILS

2.1 Teaching Times and Locations

Lectures

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:

Mondays	10:00 am – 11:50 am	Old Main Building 149
Fridays	12:00 noon – 12:50 pm	Old Main Building 149

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.

Tutorials

Scheduled Tutorial Session Times are as follows:

T1	Mon	12:00 pm – 13:00 pm	Quad G052
T2	Mon	13:00 pm – 14:00 pm	Quad G035
T3	Thur	10:00 am – 11:00 am	Quad G027
T4	Thur	10:00 am – 11:00 am	Quad G025
T5	Thur	11:00 am – 12:00 pm	Quad G027

Students must attend the tutorial for which they are enrolled. Attendance will be recorded (from time to time) and count towards meeting the requirements to pass the course.

The lecture and tutorial times are correct at time of printing. Students are reminded that they should check the Course WebCT Vista site for any possible amendments.

2.2 Units of Credit

6

Parallel teaching in the course

Students enrolled in ACTL3002 must attend the undergraduate lectures. Students attending ACTL5105 must be enrolled in the Master of Actuarial Studies. Faculty and School policy does not allow undergraduate attendance at postgraduate lectures.

2.3 Summary of Course

Course Description

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; asset shares in life insurance; termination and alteration values; cost of guarantees; joint life functions; valuation of disability insurance contracts.

2.4 Course Aims and Relationship to Other Courses

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 cash flows contingent survival, death and other uncertain events.

Course Aims of the Institute of Actuaries CT5 Contingencies syllabus

1. Describe and calculate net premiums and net premium policy values of the following assurance and annuity contracts.
2. Define and use straightforward functions involving two lives.
3. Define, estimate and use straightforward functions involving selection.
4. Describe the main variable benefit, disability and long-term care contract types and calculate net premiums and reserves for them.
5. Describe the types of future expenses and bonus required for pricing and reserving and the influence of inflation on these.
6. Describe the calculation of gross premiums and reserves using the equation of value for fixed benefit and variable benefit contracts.
7. Describe the technique of discounted emerging cost, for use in pricing, reserving, and assessing profitability, for all contract types and for pensions.
8. Describe the technique of asset shares in the context of life insurance contracts and the relationship of the asset share to the retrospective reserve.
9. Calculate the benefits on the early termination of a contract, including transfer, and the premium or benefits after a change in the terms of a contract.
10. Describe the calculation of the cost of guarantees and options under life insurance contracts.
11. Describe the principal forms of heterogeneity within a population and the ways in which selection can occur.
12. Describe the process of population projection and its main determinants.

Relationship of this course to other course offerings

This course covers the mathematical foundations of life insurance and superannuation models. 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 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.

2.5 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 involving death, survival and other similar contingent events.
2. Developed an ability to assess risk inherent in cash flows resulting from these contingent events.
3. Developed an understanding of the life insurance and life annuity products that may be available in the market.
4. Developed an understanding of basic valuation and funding of superannuation benefits.
5. Enhanced their skills of integrating contingent valuation concepts and their application to practical situations.
6. Developed the ability to assess calculations of premiums and policy values of financial contingent products for reasonableness.
7. Developed an ability to apply these technical skills to practical valuation problems in the life insurance and annuity markets.
8. Developed basic presentation and discussion skills for explaining life insurance and superannuation problems in simple terms.

Graduate Attributes

Course Learning Outcomes	ASB Graduate Attributes
1, 2, 3, 4	1. Critical thinking and problem solving
8	2. Communication
	3. Teamwork and leadership
5	4. Social, ethical and global perspectives
6	5. In-depth engagement with relevant disciplinary knowledge
7	6. Professional skills

3. LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

In this course we will take an active learning approach which stresses interactive teaching and learning. We look for active student contributions through discussion and questioning that reflects reading and experience. We expect students to come and be prepared for each lecture and tutorial class. To prepare for the course, each week students must:

- Prepare yourself through the weekly readings
- Work through the questions and exercises in the tutorial classes
- Download the weekly lecture notes/tutorials from the course website
- Be ready to participate in the class discussions, group work and activities
- Use consultation hours
- Prepare and hand in the main assignment timely
- Prepare class quizzes and final exam

3.2 Learning Activities and Teaching Strategies

Learning Activities

The course textbooks, 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.

Teaching Strategies

Lectures will cover the main topics and provide coverage of the course concepts. They are an opportunity for students to develop an understanding of the main topics covered in the course and the level of knowledge expected. They provide a guide to the course of study during the session and what material students need to read and review. Students will need to read the prescribed readings prior to the lecture.

Tutorials are for students to ask questions on aspects of the course that need further clarification, to develop presentation skills, and to interact with other students in the course. Students need to attempt the tutorial problems prior to the tutorial and identify problems that require further discussion. They are an opportunity to learn from other students and to develop team skills by working on problems with other students.

4. ASSESSMENT

4.1 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 an assessment. This is an important workplace requirement and students need to ensure they meet deadlines.

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).

4.2 Assessment Details

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

Assessment Task	Weighting	Learning Outcomes assessed	ASB Graduate Attributes assessed	Length	Due Date
1. Tutorial Presentation	5%	1, 8	1, 2	20 minutes	Ongoing
2. Class Test 1	7.5%	1, 2, 3, 6, 7	1, 5	50 minutes	Week 4 (Friday 3 April)
3. Class Test 2	7.5%	1, 2, 5, 6, 7	1, 5	50 minutes	Week 8 (Friday 8 May)
4. Assignment	10%	1, 2, 3, 5, 6, 7	1, 2, 4, 5, 6	3,000 words	Week 10, (Friday 22 May 12:00 noon)
5. Final Examination	70%	1, 2, 3, 4, 5, 6, 7	1, 5, 6	3 hours	Exam period

Tutorial Presentation

Communication skills is one of the most important graduate attributes that employers of commerce and actuarial graduates require (LO8, GA2). 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 for you to develop this skill (LO1, GA1).

During the session, students will be allocated a tutorial presentation. Each tutorial presentation consists of an oral presentation and discussion of at least one of the tutorial exercises set for that week.

Written answers to the tutorial exercises presented must be handed in at the end of the tutorial.

Failure to appear on time for an oral presentation, or to submit a written answer, will result in a zero mark and unsatisfactory performance for the purposes of passing the course 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 web site. Students should review this before their presentation.

Class Tests

Technical skills are important in practice and this course provides foundation technical skills that will be useful throughout your working life (LO1 LO7, GA1).

Test 1 will cover life insurances, life annuities, and Net premium valuation (LO1, LO2, LO3, LO6, GA1, GA5).

Test 2 will cover benefit reserves, gross premiums, and multiple lives (LO1, LO2, LO5, LO6, LO7, GA1, GA5).

In order to assess your understanding of the technical skills covered in the course aims there will be two 50-minute class tests during the session. The tests will be administered during lectures. Each test will be worth 7.5% of the total assessment for the course. The test 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 class tests. 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.

Assignments

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 (LO1, LO2, LO3, LO6, GA1, GA2).

There will be one major Assignment for this course involving the practical application of course concepts to a financial market problem. This will provide students with an opportunity to also develop writing skills. It will cover life insurances, life annuities, net premium valuation, benefit reserves, gross premiums, multiple lives, and profit testing (LO1, LO2, LO3, LO5, GA4, GA5 GA6).

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

Final Examination

The final examination will assess student's understanding of the concepts covered in the course and their ability to apply them to financial market problems. It will cover all of the lecture materials and the assignment contents (LO1, LO2, LO3, LO4, LO5, LO6, LO7, GA1, GA5, GA6).

The final examination will be a three-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.

4.3 Assessment Format

Details of format for submission of assignments are included with the assignment and available from the course web site.

4.4 Assignment Submission Procedure

Assignments must be placed in the box provided outside Quad 2059, Level 2 Quadrangle Building, near the Actuarial Studies Office. 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.

4.5 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. ACADEMIC HONESTY AND PLAGIARISM

The University regards plagiarism as a form of academic misconduct, and has very strict rules regarding plagiarism. For UNSW policies, penalties, and information to help you avoid plagiarism see: <http://www.lc.unsw.edu.au/plagiarism/index.html> as well as the guidelines in the online ELISE tutorial for all new UNSW students:

<http://info.library.unsw.edu.au/skills/tutorials/InfoSkills/index.htm>.

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.

To see if you understand plagiarism, do this short quiz:

<http://www.lc.unsw.edu.au/plagiarism/plagquiz.html>

For information on how to acknowledge your sources and reference correctly, see:

<http://www.lc.unsw.edu.au/onlib/ref.html>

For the ASB Harvard Referencing Guide, see:

http://www.docs.fce.unsw.edu.au/fce/EDU/harvard_ref_guide.pdf

6. COURSE RESOURCES

Textbooks

The textbooks for the course are:

Bowers, N.L. Gerber, H.U., Hickman, J.C., Jones, D.A. and Nesbitt, C.J. (1997), Actuarial Mathematics, Society of Actuaries, 2nd Edition [A solutions manual is available for purchase. Solutions manual is strongly encouraged, as problems assigned from Bowers for tutorials will not be provided solutions.]

Gerber, H.U. (1997), Life Insurance Mathematics, Springer-Verlag, 3rd Edition.

Other References (highly recommended)

The following reference also provides a detailed and comprehensive coverage of the topics covered in the Course. Besides, there are topics for CT5 that are not covered in either Bowers, et al. nor Gerber. For such topics, we suggest:

The Actuarial Education Company (ActEd), Course CT5 Course Notes.

Library information/subject guides etc. See:

<http://info.library.unsw.edu.au/web/services/services.html>

7. COURSE EVALUATION AND DEVELOPMENT

Each course in actuarial studies at UNSW is reviewed each session by the course co-ordinator using student evaluative feedback from UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process. 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 the previous evaluation of the course planned improvements for this offering were to review the functioning of tutorials and to improve the feedback given to students for assessment tasks. For tutorials it was considered necessary to ensure time limits on student presentations were strictly adhered to so that there was sufficient time for discussion of more difficult problems in the tutorial. Tutors will also be required to provide students with more feedback on assessment tasks.

8. STUDENT RESPONSIBILITIES AND CONDUCT

Students are expected to be familiar with and adhere to university policies in relation to class attendance and general conduct and behaviour, including maintaining a safe, respectful environment; and to understand their obligations in relation to workload, assessment and keeping informed.

Information and policies on these topics can be found in the 'A-Z Student Guide': <https://my.unsw.edu.au/student/atoz/ABC.html>. See especially, information on 'Attendance and Absence', 'Academic Misconduct', 'Assessment Information', 'Examinations', 'Special Consideration', 'Student Responsibilities', 'Workload' and policies such as 'Occupational Health and Safety'.

8.1 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, research, working on exercises and 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.

8.2 Attendance

Your regular and punctual attendance at lectures and seminars is expected in this course. University regulations indicate that if students attend less than eighty per cent of scheduled classes they may be refused final assessment.

8.3 Special Consideration and Supplementary Examinations

UNSW policy and process for Special Consideration applies (see <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.

The 'ASB Policy and Process for Special Consideration and Supplementary Exams in Undergraduate Courses' is available at:

<http://wwwdocs.fce.unsw.edu.au/fce/current/StudentSuppExamProcedure.pdf>.

Further information for undergraduate students is on the ASB website (see '[Policies and Guidelines for Current Students](#)').

Consideration for Missed Assessments (other than final examination)

If you miss a test or are unable to submit your assignment by the due time & 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.

8.4 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 which 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 www.my.unsw.edu.au.

8.5 Occupational Health and Safety

UNSW Policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others. For more information, see: <https://my.unsw.edu.au/student/atoz/OccupationalHealth.html>.

8.6 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.

9. ADDITIONAL STUDENT RESOURCES AND SUPPORT

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

- **ASB Education Development Unit (EDU)** (www.business.unsw.edu.au/edu)
Academic writing, study skills and maths support specifically for ASB students. Services include workshops, online and printed resources, and individual consultations. EDU Office: Room GO7, Ground Floor, ASB Building (opposite Student Centre); Ph: 9385 5584; Email: edu@unsw.edu.au
- **UNSW Learning Centre** (www.lc.unsw.edu.au)
Academic skills support services, including workshops and resources, for all UNSW students. See website for details.
- **Library training and search support services:** <http://info.library.unsw.edu.au>
- **UNSW IT Service Desk:** Technical support for problems logging in to websites, downloading documents etc. Library, Level 2; Ph: 9385 1333. Website: www.its.unsw.edu.au/support/support_home.html
- **UNSW Counselling Service** (<http://www.counselling.unsw.edu.au>)
Free, confidential service for problems of a personal or academic nature; and workshops on study issues such as 'Coping With Stress' and 'Procrastination'. Office: Level 2, Quadrangle East Wing, Ph: 9385 5418
- **Student Equity & Disabilities Unit** (<http://www.studentequity.unsw.edu.au>)
Advice regarding equity and diversity issues, and support for students who have a disability or disadvantage that interferes with their learning. Office: Ground Floor, John Goodsell Building; Ph: 9385 4734.

10. COURSE SCHEDULE

Week Number	Class days	Topics Covered	Assignment/Test
1	9, 13 March	Life insurances (single life)	Home Work: Review of Survival models and life tables
2	16, 20 March	Life annuities (single life)	
3	23, 27 March	Net premium valuation	
4	30 March, 3 April	Benefit reserves or provisions	Class TEST 1 (Friday 3 April)
5	6 April 10 April - Public Holiday	Analysis of benefit reserves; with-profit policies	Assignment out (Monday 6 April)
University Recess			
6	20, 24 April	Gross premiums and provisions	
7	27 April, 1 May	Insurances and annuities for joint (or multiple) lives	
8	4, 8 May	Profit testing	Class TEST 2 (Friday 8 May)
9	11, 15 May	Multiple state and multiple decrement models	
10	18, 22 May	Applications of multiple state and multiple decrement models	Assignment due (Friday 22 May, 12:00 noon)
11	25, 29 May	Pension funds	
12	1, 5 June	Pension funds	
Exam Period	12 - 27 June		

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

Week	Lecture	Topics and Reading
1	9, 13 March	• Present value random variable • Types of insurances: whole life, term, pure endowment, endowment, deferred • Insurances payable at the moment of death vs. insurances payable at the end of year of death • Insurances with varying benefits (increasing, decreasing benefits) • Insurances payable at the end of the m-th of a year of death • Relationships between continuous and discrete insurances Lecture notes Bowers et al., Chapter 4; Gerber, Chapter 3
2	16, 20 March	• Present value r.v. of annuity payments • Types of annuities: whole life, temporary, deferred • Continuous vs. discrete • Life annuities with m-thly payments • Apportionable annuities-due • Complete annuities-immediate • Relationships between life insurances and annuities Lecture notes Bowers et al., Chapter 5; Gerber, Chapter 4
3	23,27 March	• Insurer's net random future loss • Equivalence principle for computing net premiums • Fully discrete premiums • Fully continuous premiums • True m-thly payment premiums • Apportionable premiums • Other premium calculation principles Lecture notes Bowers et al., Chapter 6; Gerber, Chapter 5
4	30 March 3 April	Class TEST 1 (Friday 3 April) Test coverage: Weeks 1 to 3 lectures • Insurer's prospective loss random variable • Prospective reserves • Fully discrete reserves • Fully continuous reserves Lecture notes Bowers et al., Chapter 7; Gerber, Chapter 6

5	6 April 10 April - public holiday	• Retrospective reserves • Equivalence between prospective and retrospective reserves • Interpretation of retrospective formula • Recursive calculations of fully discrete reserves • Interpretation of recursive formulas Lecture notes Bowers et al., Chapter 7 & 8; Gerber, Chapter 6 • With-profit contracts • Types of bonuses • Reversionary bonuses • Net premiums and provisions for with-profit contracts Lecture notes ActEd CT5 Course Notes, Chapter 6
University recess		
6	20, 24 April	• Types of life insurance contract expenses • Gross premium calculations based on the equivalence principle • Reserving based on gross premiums Lecture notes ActEd CT5 Course Notes, Chapter 7 Bowers, et al., Chapter 15; Gerber, Chapter 10
7	27 April, 1 May	• Joint distributions of future lifetimes • Joint life status • Last-survivor status • Dependent lifetime models • Insurances and annuities involving joint lives • Evaluation using special mortality laws • Simple contingent functions Lecture notes Bowers, et al., Chapter 9; Gerber, Chapter 8
8	4, 8 May	Class TEST 2 (Friday 8 May) Test coverage: Weeks 4 to 7 lectures • Discounted emerging costs • Unit-linked contracts • Expected cash flows for whole life, endowment, term, annuities, and unit-linked contracts • Profit signature; profit signatures for different reserve bases • NPV of profit • Profit margin Lecture notes ActEd CT5 Course Notes, Chapter 10

9	11, 15 May	- Determining provisions using profit testing Lecture notes ActEd CT5 Course Notes, Chapter 11 - Multiple state models: alive-death models, healthy-sickness models - Cash flows in multiple state models - Multiple decrement models: two random variables - Associated single decrement tables - Construction of multiple decrement tables Lecture notes ActEd CT5 Course Notes, Chapter 13 Bowers et al., Chapter 10; Gerber, Chapter 7
10	18, 22 May	Assignment due (Friday 22 May 12:00 noon) - Applications of multiple decrement theory - Actuarial present values and their numerical evaluation - Disability benefits with individual life insurance - Introduction to pension funds - Defined-benefit vs Defined-contribution schemes - Demographic assumptions Lecture notes Bowers et al., Chapter 11
11	25, 29 May	- Service tables and salary scales - The value of future contributions - The value of pension benefits - Fixed pension schemes Lecture notes ActEd CT5 Course Notes, Chapter 14
12	1, 5 June	- Average and final salary schemes - Lump sums on retirement - Death and withdrawal benefits - Return of contributions on death or withdrawal - Spouse's benefits Lecture notes ActEd CT5 Course Notes, Chapter 14
Exam Period	12 - 27 June	

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