UNSW Business School

School of Risk and Actuarial Studies

ACTL2102
Foundations of Actuarial Models

Course Outline
Semester 2, 2017

Course-Specific Information

The Business School expects that you are familiar with the contents of this course outline. You must also be familiar with the Course Outlines Policies webpage which contains key information on:

- Program Learning Goals and Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Student Support and Resources

This webpage can be found on the Business School website:
https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies

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COURSE-SPECIFIC INFORMATION

1 STAFF CONTACT DETAILS

Lecturer-in-charge: J.K. Woo
Room 574 UNSW Business School Building
Phone No: 9385 8806
Consultation Times – Wednesday 15:00-16:00, in front of the office of the School of Risk and Actuarial Studies, Level 6 East Wing, UNSW Business School building.

A full list of staff for this course is as follows.

Position	Name	Email
Lecturer-in-charge	J.K. Woo	TBA
Tutor	Kelvin Duong	kelvin.duong@unsw.edu.au
Tutor	Carlos Cheng	carlos.cheng@unsw.edu.au
Tutor	Nikolay Gudkov	n.gudkov@unsw.edu.au
Tutor	Anh Vu	p.vu@unsw.edu.au

Additional consultations will be provided for the mid-term and final exams. These will be scheduled and announced during the session.

2 COURSE DETAILS

2.1 Teaching Times and Locations

Lectures start in Week 1(to Week 12): The Time and Location are:

Monday	16:00-18:00	Ainsworth G03
Wednesday	11:00-12:00	Law Theatre G04

Tutorials start in Week 2 (to Week 13). The Groups and Times are:

Monday	9:00-10:00	Red Centre West 4037	Kelvin Duong
Monday	10:00-11:00	Red Centre West 4037	Kelvin Duong
Monday	11:00-12:00	Chemical Sc M10	Kelvin Duong
Monday	13:00-14:00	Morven Brown LG30	Anh Vu
Monday	14:00-15:00	Morven Brown LG30	Anh Vu
Monday	15:00-16:00	Ainsworth G02	Anh Vu
Wednesday	10:00-11:00	Goldstein G09	J.K. Woo
Wednesday	12:00-13:00	Law 111 Computer Lab	Nikolay Gudkov
Wednesday	13:00-14:00	Law 111 Computer Lab	Nikolay Gudkov
Wednesday	14:00-15:00	Law 275	Nikolay Gudkov
Thursday	15:00-16:00	Law G17 Computer Lab	Carlos Cheng
Thursday	16:00-17:00	Law G17 Computer Lab	Carlos Cheng

2.2 Units of Credit

The course is worth 6 units of credit.

2.3 Summary of Course

This course provides an introduction to the stochastic models used by actuaries to model both liabilities and assets and illustrates their applications in actuarial work. Topics covered include main features of a Markov chain and applications to experience rating; Markov process models and applications to insurance, survival, sickness and marriage models; simple time series models including random walk and auto-regressive models and their application to investment variables; properties of Brownian motion and applications to investment variables; methods for simulation of a stochastic process. Students will be expected to implement models using the R software in a numerical computer package.

2.4 Course Aims and Relationship to Other Courses

The primary aim of this course is to provide students with an understanding of the mathematical concepts and techniques that are used by actuaries to model stochastic processes of both assets and liabilities. The aims of this course are to help students develop:

A. An understanding of Markov Chains and capability to implement for a frequency-based experience rating No Claim Discount (NCD) scheme using data.
B. An understanding of Markov processes that can be used for insurance, survival, sickness, financial modelling, credit and operational risk management.
C. Develop an understanding of the main concepts of “Monte Carlo” simulation of a stochastic process and a capability to carry out simple simulation procedures.
D. Develop an understanding of the basic concepts underlying the analysis of time series model and a capability to apply basic concepts to data.
E. An understanding of Brownian motions that can be used for asset and financial derivatives pricing and interest rate modelling
F. Express your views on, and understanding of, an aspect of stochastic modelling
G. Work collaboratively.

This course provides an introduction to the stochastic models used by actuaries to model both liabilities and assets and illustrates their applications in actuarial work. The material is at a mathematically rigorous level with a strong foundation in mathematics. The required knowledge of the course is a good understanding of probability and statistics as covered in ACTL2131 Probability and Mathematical Statistics or MATH2801 and MATH2831. You should also be proficient with calculus and linear algebra. The assumed knowledge of the course is a good understanding of mathematics as covered in MATH1151 and MATH1251. Consult the Course Coordinator if you do not have the required mathematical background.

The course will have applications in other courses in the actuarial major. More advanced models are covered in ACTL3141 Actuarial Models and Statistics and ACTL3162 General Insurance Techniques. The course is necessary knowledge for the more advanced coverage in ACTL3141 Actuarial Models and Statistics, ACTL3151 Life Contingencies, ACTL3162 General Insurance Techniques, and ACTL3182 Asset-Liability and Derivative Models. Advanced Data Analytics methods relevant to actuarial work is covered in ACTL3142 Actuarial Data and Analysis.

The course contributes to the actuarial professional subjects CT4 Models & CT6 Statistical Models of the Institute of Actuaries. Students achieving an average of 65% or

higher of ACTL2102 (1/3 of grade) and ACTL3141 (2/3 of grade) marks will be recommended for exemption from the professional CT4 examination. Students achieving an average of 65% or higher of ACTL2102 (1/3 of grade) and ACTL3162 (2/3 of grade) marks will be recommended for exemption from the professional CT6 examination. Exemptions from professional actuarial examinations require above average performance in the equivalent University course.

During this course, students will use the R software to solve statistical problems (primarily in the time series component of the course). The R software is considered by many statisticians and researchers to be a very versatile statistical package, and is open-source software which is freely downloadable from the R-project website (www.r-project.org). R codes and output will be submitted as part of the course project (see Section 4.3) and you are expected to interpret R output at the final exam. Computing is an integral component of this course, and you are expected to become proficient in time series applications in R by the end of this course. In addition, students are expected to be familiar with a word processing package (such as WORD) and spreadsheet package (such as EXCEL).

2.5 Student Learning Outcomes

The aims of Section 2.4 (A to F) have been broken down into the following learning outcomes. At the end of the course students should be able to:

A1. Describe and explain concepts and principles of actuarial modelling.
A2. Describe and explain the main terminology of stochastic processes, including their classification into different types.
A3. Define the key features and properties of a Markov Chain
A4. Developed a capability to implement Markov Chains for a frequency-based experience rating No Claim Discount (NCD) scheme using data.
B1. Define the main features of a Markov Process and use simple Markov Processes to analyse insurance, survival, sickness and marriage models.
B2. Developed an understanding of Markov processes that can be used for insurance, survival, sickness and financial modelling.
B3. Developed an understanding of Poisson processes that can be used for insurance, credit and operational risk management
C1. Developed an understanding of the main concepts of “Monte Carlo” simulation of a stochastic process and a capability to carry out simple simulation procedures.
C2. Explain the concepts of ‘Monte Carlo’ simulation of a stochastic process using a series of pseudo-random numbers and apply simulation to simple actuarial problems.
D1. Define the main concepts underlying the analysis of time series models including simple nonstationary models
D2. Apply of time series models to actuarial models for investment returns and inflation.
E1 Define and apply the main concepts of Brownian motions
F1 Express his/her views on, and understanding of, an aspect of statistic models.
F2 Developed communication skills for the presentation of complex statistical models in written report form
G1 Construct written work which is logically and professionally presented
G2 Work collaboratively to complete a task

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.

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').

For more information on Program Learning Goals and Outcomes, see the School's Course Outlines Policies webpage available at https://www.business.unsw.edu.au/degrees-courses/course-outlines/policies

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**
This course helps you to achieve the following learning goals for all Business undergraduate students:		*On successful completion of the course, you should be able to:*	*This learning outcome will be assessed in the following items:*
1	Knowledge	Learning outcomes A1 – F2	• Mid-term exam • Assignment • Final Exam
2	Critical thinking and problem solving	Learning outcomes A1 – F2	• Mid-term exam • Assignment • Final Exam
3a	Written communication	Learning outcomes G1 – G2	• Assignment
3b	Oral communication	Not specifically addressed in this course	Not specifically assessed in this course
4	Teamwork	Learning outcomes G1-G2	• Assignment
5a.	Ethical, social and environmental responsibility	Not specifically addressed in this course	Not specifically assessed in this course
5b.	Social and cultural awareness	Not specifically addressed in this course	Not specifically assessed in this course

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

Lectures will review 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 the material students need to read and review. Students should read the prescribed readings prior to the lecture.

Tutorial exercises discussions and in-class activities 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 homework problems alone first and identify problems that require closer review. Students are strongly encouraged to work in teams as it is an opportunity to learn from other students and to develop teamwork skills.

3.2 Learning Activities and Teaching Strategies

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

By its nature, the actuarial program develops problem-solving and professional skills, and all activities contribute to that development. Thus, special care is taken when designing in-class activities, homework problems and optional readings.

Students are expected to perform these activities in the following time frame (for the outcomes of week *k*):

Week *k-1*	**Week *k***	**Week *k+1***
Required readings Have a first look at the homework problems (if possible, in a team)	Attend lecture Attempt homework problems (if possible, in a team), and prepare questions Review lecture notes, and seek help if needed Review recorded lecture from Echo 360	Attend in-class discussion of homework problems and review solutions Review relevant past quizzes and final exam questions Optional readings and exercises

Thus, you should, in a given week, work on these three different stages for their corresponding three different course weeks. Thanks to the 12-weeks-in-13 model, homework problems are discussed in Week *k+1*.

Detailed information about these activities for each week is available on Moodle (see also the summary table at the end of this document).

Tutorials are for students to ask questions on aspects of the course that need further clarification, to develop problem solving 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 this course, you must:

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

4.2 Assessment Details

Assessment Task	Weighting	Length	Due Date
Self-assessment	NA	1 hour	31 August 2017
Mid-term exam	20%	1 hour	**4 September 2017 4:00pm-5:30pm**
Assignment	20%	TBA	**6 October 2017 5:00pm**
Final exam	60%	2 hours	TBA

4.2.1 Self-assessment

You will be given a past mid-term exam paper with solutions for self-assessment. You are expected to attempt the past paper in an exam condition and assess your performance. This is aimed at providing you feedback for your study and you are expected to complete this before the census day.

4.2.2 Mid-term exam

The midterm will assess students' understanding of the concepts covered in the course and their ability to apply them to stochastic actuarial modelling problems. The midterm assesses Course Learning Outcomes A1-B2 (e.g. material covered in lecture week 1 up to and including week 4) and the Business School Program Learning Goals and Outcomes 1 and 2 (see Section **Error! Reference source not found.**).

The midterm will be a one-hour written paper. Normal examination rules apply to the conduct of the midterm. The midterm will be closed book. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations" into the midterm. This must be fully **UNANNOTATED**. Students may bring their own calculators. All calculators must be UNSW approved. The University will not supply calculators to students for use in examinations. It is the student's responsibility to be familiar with the rules governing the conduct of examinations. The midterm will be held on Monday 4th September starting at 4:20pm sharp, you can enter the room from 4:00pm. The location of the midterm will be announced on the course website.

The midterm requires written responses, with students earning marks for correct mathematical working as well as part marks for incorrect responses with correct method and reasoning. A clear indication of all of the steps involved in your calculations must be shown. The midterm tests not only your knowledge of the material, but also the depth of your understanding of it.

Feedback regarding the performance in the midterm will be provided through the return of marked midterm paper and discussion in the tutorial.

4.2.3 Assignment

Description of the task

There will be one major assignment project for this course. The project involves teamwork between students. The assignment aims to develop Business School Undergraduate Coursework Program Learning Goals and Outcomes 1, 2, 3a and 4. Full information about the assignment will be released early in the session.

Feedback regarding the performance in the assignment will be provided through *Review* using rubrics related to PLG.

Assignment submission

Reports must be submitted via the Turnitin submission box on the Moodle's course website. The assignment should be submitted before 5:00pm on 6 October through the Turnitin link in the course webpage.

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: student.unsw.edu.au/turnitin. 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 should keep a copy of all work submitted for assessment and to keep the returned marked assignments.

Late submission

The School of Risk and 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 lecturer-in-charge if there is a valid reason for late submission and used in cases where your final overall results are marginal.

4.2.4 Final Exam

The final exam will assess students' understanding of the concepts covered in the course and their ability to apply them to stochastic actuarial modelling problems. The final exam assesses Course Learning Outcomes A1-E1 and the Business School Program Learning Goals and Outcomes 1 and 2 (see Section **Error! Reference source not found.**).

The final exam will be a two-hour written paper. The final exam will be closed book. Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations" into the final exam. This must be fully **UNANNOTATED**. Students may bring their own calculators. All calculators must be UNSW approved. The University will not supply calculators to students for use in examinations. It is the student's responsibility to be familiar with the rules governing the conduct of examinations.

The final exam requires written responses, with students earning marks for correct mathematical working as well as part marks for incorrect responses with correct method and reasoning. A clear indication of all of the steps involved in your calculations must be

shown. The final exam tests not only your knowledge of the material, but also the depth of your understanding of it.

Feedback regarding the performance in the final exam can be obtained by viewing your script. The procedure regarding viewing the marked final exam paper is outlined in course outline part B, available at: www.business.unsw.edu.au

4.3 Special Consideration, Late Submission and Penalties

For information on Special Consideration please refer to the Business School's Course Outlines Policies webpage.

Special consideration and assessments other than the Final Exam in undergraduate and postgraduate courses:

For courses offered by the School of Risk and Actuarial Studies, the weight of the assessment items for which special consideration is granted is re-allocated to the Final Exam. Alternatively, in exceptional cases and only for assessment items with a submission deadline, a delayed deadline may be granted. This may be no more than 5 business days after the initial deadline, and must be before feedback is provided to students.
Special consideration **does not** entitle students to a supplementary opportunity to complete the assessment item.

Late submission of assessment items

When an assessment item had to be submitted by a pre-specified submission date and time and was submitted late, the School of Risk and Actuarial Studies will apply the following policy.

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 assessment item 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

4.4 Protocol for viewing final exam scripts

The UNSW Business School has set a protocol under which students may view their final exam script. Please check the protocol here.

Individual Schools within the Faculty may set up a local process providing it is in keeping with the Faculty protocol. The School of Risk and Actuarial Studies implements the abovementioned faculty guidelines in the following way:

1. There will be only one viewing.
2. Students must register (that is, lodge a request to view their final exam script) to rasadmin@unsw.edu.au after results are released, but no later than COB on Wednesday 6 December 2017.
3. The viewing will take place on Monday 11 December 2017, at a time and location to be announced to registered students by COB on Friday 8 December 2017. Student

MUST remain available for the WHOLE of 11 December 2017 until the time of their viewing is communicated.

Note that students must make a separate, subsequent appointment with the LIC, should they wish to lodge a formal application for re-assessment.

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 website for this course is on Moodle at:
http://moodle.telt.unsw.edu.au

Moodle course website includes the following:

- Announcements
- Course outline
- Lecture slides
- Tutorial exercises and solutions
- Midterm exam and assignment information and feedbacks

Textbooks
The prescribed textbooks for the course are:

- Sheldon M. Ross, Introduction to Probability Models, 11th edition, Academic Press 2014.
- Ngai Hang Chan, Time Series: Applications to Finance, 2nd edition, Wiley publications, 2010
- Formulae and Tables for Actuarial Examinations of the Faculty of Actuaries and the Institute of Actuaries

Suggested (optional) readings are:

- **[CT4]** The Actuarial Education Company (2016), CT4 Combined Materials Pack Chapters 1 to 6, ActEd. www.acted.co.uk (This is the Institute of Actuaries study material for the CT4 exam). Syllabus: www.actuaries.org.uk
- **[CT6]** The Actuarial Education Company (2016), CT6 Combined Materials Pack Chapters 12 to 14, ActEd. www.acted.co.uk (This is the Institute of Actuaries study material for the CT6 exam). Syllabus: www.actuaries.org.uk
- **[CT8]** The Actuarial Education Company (2016), CT8 Combined Materials Pack Chapters 8 and 9, ActEd. www.acted.co.uk (This is the Institute of Actuaries study material for the CT8 exam). Syllabus: www.actuaries.org.uk
- Sheldon M. Ross, Stochastic Processes, 2nd edition, John Wiley, 1996
- Chris Chatfield, The Analysis of Time Series: An Introduction, 6th edition, CRC Press, 2003.

- Douglas C. Montgomery, Cheryl L. Jennings, and Murat Kulahci, Introduction to Time Series Analysis and Forecasting, Wiley Series in Probability and Statistics, 2008.

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 end of semester myExperience survey 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.

Feedback from Semester 2 2016 indicated that the weekly contents were not balanced through the whole semester. This has been considered and the course has been restructured. In particular, the course has allocated a heavier weight on core concepts and techniques and a lower weight to some advanced topics.

7 COURSE SCHEDULE

Week	Topic	Reference	Other activities / assessment
Week 1	Introduction to the course Principles of actuarial modelling Introduction to stochastic processes Introduction to Markov Chains Chapman-Kolmogorov equations Classification of states	Readings Ross, 11th Edition, Chapter 4 (4.1-4.3) Ross, 10th Edition, Chapter 2(2.8), Chapter 4 (4.1-4.3) Reference ACTED Chapter 1 and 2 CT4	
Week 2	Markov Processes Limiting Probabilities Mean time in transient states Gambler's ruin Branching processes Time reversible Markov chains	Readings Ross, 11th Edition, Chapter 4 (4.4, 4.5.1, 4.6-4.8) Ross, 10th Edition, Chapter 4 (4.4, 4.5.1, 4.6-4.8) Reference ACTED Chapter 3 CT4	
Week 3	Exponential Distribution Poisson Process Generalizations of the Poisson Process	Readings Ross, 11th Edition, Chapter 5 Ross, 10th Edition, Chapter 5 Reference ACTED Chapter 5 CT4	
Week 4	Continuous Time Markov Chains Transition probabilities Kolmogorov equations Limiting probabilities	Readings Ross, 11th Edition, Chapter 6 (6.1-6.5) Ross, 10th Edition, Chapter 6 (6.1-6.5) Reference ACTED Chapters 6 CT4	
Week 5	Actuarial applications	Reference ACTED Chapter 4 and 6 CT4	
Week 6	Introduction to Simulation Generating continuous random variables	Readings Ross, 11th Edition, Chapter 11 (11.1-11.5)	

	Simulating discrete random variables Stochastic Process Simulation Multivariate normal Variance Reduction Techniques Number of runs	Ross, 10th Edition, Chapter 11 (11.1-11.5) Reference ACTED Chapter 14 CT6	
Week 7	Introduction to time series Properties of a univariate time series Trends, seasonal cycles, transformation	Readings Chan, Chapters 1 Reference ACTED Chapter 12 and 13 CT6	**Mid-term exam** **4 September 2017, 4:00pm-5:30pm**
Week 8	Time Series Sample correlation functions ACF Moving Average (MA) models Autoregressive (AR) models	Readings Chan, Chapter 2 and 3 Reference ACTED Chapter 12 and 13 CT6	
Week 9	Time Series ARMA models ARIMA models Model parameter estimations Partial ACF	Readings Chan, Chapters 3 and 4 Reference ACTED Chapter 12 and 13 CT6	
Mid-semester break: Saturday 23 September - Monday 2 October inclusive			
Week 10	Time Series Order selections Residual analysis Model building	Readings Chan, Chapter 4 Reference ACTED Chapter 12 and 13 CT6	**Assignment Due** **6 October 2017, 5:00pm**
Week 11	Time Series Nonstationarity Unit root test Introduction to forecasting	Readings Chan, Chapters 8 and 6	

Week 12	Time Series Simple forecasts Box-Jenkins approach Introduction to Brownian motion	Readings Chan, Chapter 6 Ross, 11th Edition, Chapter 10 (10.1) Ross, 10th Edition, Chapter 10 (10.1)	
Week 13	NO LECTURES		

8 Professional Recognition

The UNSW Australia Business School actuarial program is accredited by the Actuaries Institute in Australia and recognised for exemptions for core technical subjects of the Institute and Faculty of Actuaries in the UK.

Our programs are recognised for Validation by Educational Experience (VEE) by the North American Society of Actuaries and Casualty Actuarial Society. We are also recognised as a Center of Actuarial Excellence by the North American Society of Actuaries.

The profession of actuary is one of the oldest in the financial world. It is highly regarded and requires the completion of, or exemption from, examinations set by the professional bodies.

The Actuaries' Institute (AU), the Institute and Faculty of Actuaries (UK), the Society of Actuaries (North America) and the Actuarial Society of South Africa have mutual recognition arrangements that allow qualified Fellows to practice as fully qualified actuaries in their respective countries – with appropriate experience requirements. Qualified actuaries can also practice in many other countries without taking any additional examinations.

Institute of actuaries

This course corresponds largely with the actuarial professional subjects CT4 Models and CT6 Statistical Methods (& CT8 Financial Economics). The course's Learning Outcomes (Section **Error! Reference source not found.**) relate to the aims of the Institute of Actuaries in the following way:

Course LO (Section **Error! Reference source not found.**)	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	E1
Institute of Actuaries aims	CT4 (i)	CT4 (ii)	CT4 (iii)	CT4 (iii)	CT4 (iv)	CT4 (iv)	CT4 (iv)	CT6 (ix)	CT6 (ix)	CT6 (viii)	CT8 (viii)

The course contributes to the actuarial professional subjects CT4 Models & CT6 Statistical Models of the Institute of Actuaries. Exemptions from professional actuarial examinations require above average performance in the equivalent university course.

- Students achieving a weighted average of 65% or higher of ACTL5103 (1/3 of grade) and ACTL5104 (2/3 of grade) marks will be recommended for exemption from the professional CT4 examination.
- Students achieving a weighted average of 65% or higher of ACTL5103 (1/3 of grade) and ACTL5106 (2/3 of grade) marks will be recommended for exemption from the professional CT6 examination.

For more information on applying for exemptions to be accredited and the application instructions (students normally have completed their degree before they apply): www.business.unsw.edu.au/about/schools/risk-actuarial/programs/professional-recognition/accreditation-exemptions

Actuaries Institute

The Actuaries Institute allows students to become University Subscribers free of charge. Full-time students studying at UNSW Australia Business School who are members of ASOC are eligible. To sign up, go to: www.actuaries.asn.au

The university subscriber offer is not a membership of the Actuaries Institute, but a subscription to receive information of career opportunities, invitations to selected events and online publications. You might also consider joining the Actuaries Institute, there are advantages in doing so while a full-time student, for membership information, go to: www.actuaries.asn.au