

## **ACTL1101 Introduction to Actuarial Studies**

### **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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Dear Students

Welcome to ACTL1101 Introduction to Actuarial Studies! I am also delighted to formally welcome you to the Bachelor of Actuarial Studies. Entry requirements are extremely high, and you can be proud of having been admitted to the degree.

Now my role in this course is to make you really excited about it!  
(And yes, of course, it is also to equip you with some of the fundamental tools you will need for the next few years.)

The main goal of this course is to give you an overview of what Actuarial Studies are. This will be done by equipping you with fundamental tools, and by discussing the main areas of practice, and some of the issues they are currently facing.

I suspect some of you still struggle with being able to explain well to your friends and family what an actuary is and what she does. Hopefully by the end of the course you will be able to talk about it with passion and expertise.

I am delighted to announce lots of great changes in the course:

- Lectures now balance quantitative and qualitative aspects: technical tools, and actuarial practice;
- Tutorials have also been completely redeveloped;
- Labs have been redeveloped to best develop your computation skills with R, and your ability to manipulate and communicate data;
- Digital resources have been developed: we have interviewed senior actuaries, and school staff, so as to learn directly from the people who are at the cutting edge of their practice;
- We will be using cutting edge online collaboration tools.

This course has benefitted from funding and resources provided by UNSW as part of its 2025 Strategy to reach Academic Excellence. This was supplemented by the UNSW Business School, and also the School of Risk and Actuarial Studies. I would like to acknowledge the great feedback, support and work of the people who contributed to this significant uplift. Staff include: Brian Landrigan, Peter McGuinn, Martin Parisio, Xinda Yang. Students as Partners include: Sam Luo, Yang Hu, Grant Lian, Harry Liu, Johnny Josephine Ngan, Wong, Yooree Woo, Vivian Zhang, some of whom made significant contributions to some of the resources that were developed.

I hope you will love all of what we are doing and trying. Nevertheless, chances are you will have things to say and be able to provide constructive criticism and feedback. I encourage you to do so during semester, but also at the end when we will run the MyExperience surveys.

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

I look forward to guiding your learning in this course!

Benjamin Avanzi

## COURSE-SPECIFIC INFORMATION

### 1 STAFF CONTACT DETAILS

Lecturer-in-charge: A/Professor Benjamin Avanzi

Room Bus 640

Phone No: 9385 0798

Email: [b.avanzi@unsw.edu.au](mailto:b.avanzi@unsw.edu.au)

Consultation Times – Tuesdays, 4(ish)-5pm (after the lecture) from 25 July 2017 to 24 October 2017, in the area in front of the school (level 6, East wing of Business School building), or by appointment for personal matters.

Tutors are:

Position	Name	Email	Short
Head Tutor	Xinda Yang	<a href="mailto:xinda.yang@unsw.edu.au">xinda.yang@unsw.edu.au</a>	XY
Tutor	Yooree Woo	<a href="mailto:y.woo@unsw.edu.au">y.woo@unsw.edu.au</a>	YW
Tutor	Grant Lian	<a href="mailto:g.lian@unsw.edu.au">g.lian@unsw.edu.au</a>	GL
Tutor	Josephine Ngan	<a href="mailto:j.ngan@unsw.edu.au">j.ngan@unsw.edu.au</a>	JN
Tutor	Vivian Zhang	<a href="mailto:vivian.zhang@unsw.edu.au">vivian.zhang@unsw.edu.au</a>	VZ
Tutor	Harry Liu	<a href="mailto:h.y.liu@unsw.edu.au">h.y.liu@unsw.edu.au</a>	HL
Tutor	Johnny Wong	<a href="mailto:johnny.c.wong@unsw.edu.au">johnny.c.wong@unsw.edu.au</a>	JW
Tutor	Yang Hu	<a href="mailto:yang.hu@unsw.edu.au">yang.hu@unsw.edu.au</a>	YH
Tutor	Sam Luo	<a href="mailto:sam.luo@unsw.edu.au">sam.luo@unsw.edu.au</a>	SL

Consultation by tutors (two hours each week) are as follows:

Week	Labs	(who)	Tutorials	(who)
2	Mon 3-4	HL	Thu 1-2	GL
3	Thu 1-2	SL	Mon 3-4	YH
4	Mon 3-4	JN	Thu 1-2	HL
5	Thu 1-2	JW	Mon 3-4	YW
6	Mon 3-4	YH	Thu 1-2	GL
7	Thu 1-2	SL	Mon 12-1 (!)	VZ
8	Mon 3-4	HL	Thu 1-2	HL
9	Thu 1-2	JW	Mon 3-4	YW
10	Mon 3-4	JN	Thu 1-2	GL
11	Thu 1-2	SL	Mon 12-1 (!)	VZ
12	Mon 3-4	YH	Thu 1-2	JW
13	Thu 1-2	SL	Mon 3-4	YH

Consultation will also be in the area in front of the school (level 6, East wing of Business School building)

## 2 COURSE DETAILS

### 2.1 Teaching Times and Locations

**Lectures** start in Week 1 (to Week 12): Ainsworth G03, Tuesdays, 2-4pm

**Tutorials** start in Week 2 (to Week 13). The groups and times are:

<b>Tutorial</b>	<b>Time</b>	<b>Place</b>	<b>Tutor</b>
F09A	Fri 09:00 - 10:00	Quadrangle G052	JW
F09B	Fri 09:00 - 10:00	Quadrangle G025	GL
F12A	Fri 12:00 - 13:00	Squarehouse 115	GL
F13A	Fri 13:00 - 14:00	Squarehouse 115	GL
M09A	Mon 09:00 -10:00	Red Centre West 2035	HL
M09B	Mon 09:00 -10:00	Red Centre West 4034	VZ
M10A	Mon 10:00 -11:00	Red Centre West 2035	YH
M10B	Mon 10:00 -11:00	Red Centre West 4034	VZ
M11A	Mon 11:00 -12:00	Squarehouse 114	YH
M11B	Mon 11:00 -12:00	Squarehouse 115	YW
M13A	Mon 13:00 -14:00	Squarehouse 114	YW
M13B	Mon 13:00 -14:00	Law Building 275	VZ
T09A	Tue 09:00 - 10:00	Blockhouse G13	XY
T09B	Tue 09:00 - 10:00	Tyree Energy Technology G17	HL

**Labs** start in Week 2 (to Week 13). The groups and times are:

<b>Tutorial</b>	<b>Time</b>	<b>Place</b>	<b>Tutor</b>
H09A	Thu 09:00-10:00	Mathews 211 BUSINESS SCHOOL comp lab	HL
H09B	Thu 09:00 - 10:00	BUSINESS SCHOOL Computer Lab 1 Quad 1043	SL
H10A	Thu 10:00 - 11:00	BUSINESS SCHOOL Computer Lab 1 Quad 1043	SL
H11A	Thu 11:00 - 12:00	BUSINESS SCHOOL Computer Lab 1 Quad 1043	JW
H12A	Thu 12:00 - 13:00	Mathews 211 BUSINESS SCHOOL comp lab	HL
T11A	Tue 11:00 - 12:00	Mathews 211 BUSINESS SCHOOL comp lab	JN
T12A	Tue 12:00 - 13:00	Mathews 211 BUSINESS SCHOOL comp lab	SL
T13A	Tue 13:00 - 14:00	Mathews 211 BUSINESS SCHOOL comp lab	SL
T17A	Tue 17:00 - 18:00	Quadrangle G021	SL
T17B	Tue 17:00 - 18:00	Mathews 211 BUSINESS SCHOOL comp lab	JW
W09A	Wed 09:00 -10:00	Quadrangle G021	XY

W09B	Wed 09:00 -10:00	Mathews 211 BUSINESS SCHOOL comp lab	JN
W10A	Wed 10:00 -11:00	Mathews 211 BUSINESS SCHOOL comp lab	YH
W17A	Wed 17:00 -18:00	Mathews 211 BUSINESS SCHOOL comp lab	YH

## 2.2 Units of Credit

The course is worth 6 units of credit.

## 2.3 Summary of Course

This course is designed to provide an introduction to actuarial studies. It covers the fundamental modelling tools used by actuaries (probability, statistics, financial mathematics), as well as some of the basic actuarial models in areas such as insurance, superannuation or financial risk management, and which will be studied in great depth during the remainder of the degree. The main areas of actuarial practice and research are also introduced and discussed. Finally, labs will provide a foundation in programming, as well as data manipulation and visualisation, with a particular focus on R.

## 2.4 Course Aims and Relationship to Other Courses

This course is offered as part of the first year core in the Bachelor of Actuarial Studies and dual degrees. The main aim of the course is to provide an overview of actuarial techniques, practice and research, that will be taught in greater depth in the rest of the degree.

The course is a prerequisite, along with MATH1251, for the courses ACTL2111 Financial Mathematics for Actuaries, and ACTL2131 Probability and Mathematical Statistics.

## 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.

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>

By the end of this course, you should be able to:

1. Evaluate and apply basic principles of probability, statistics and financial mathematics;
2. Evaluate the fundamental principles underlying risk management and insurance
3. Evaluate and apply fundamental actuarial mathematics techniques;
4. Describe how the actuarial profession is organised, its code of conduct, its main practice areas, as well as its current challenges and opportunities;

5. Interpret and create basic algorithms and control loops in pseudocode;
6. Communicate data insights effectively;
7. Perform efficient computation, as well as manipulate data, in R;
8. Work effectively in teams;

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 undergraduate coursework 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	1-4, 7	All
2	Critical thinking and problem solving	1-3, 4-8	All
3a	Written communication	6, 8	All
3b	Oral communication	6, 8	Assignment (teamwork)
4	Teamwork	8	Assignment
5a.	Ethical, social and environmental responsibility	4	Final exam
5b.	Social and cultural awareness	4	Final exam

### 3 LEARNING AND TEACHING ACTIVITIES

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

We are here to **HELP students** (you) in the learning process by developing your understanding of course topics and to provide opportunities to reflect on and gain deeper understanding of the applications of the course material. The learning process is **collaborative**, and the more you **interact with us** (teaching staff) **and with fellow students** (with your team, and others), the more you will learn and get from the course. Interaction can occur in class, in tutorials, in labs, during consultation, on course forums, etc...

Furthermore, the course will use extensive **digital resources**, some of which have been tailor made for the course; see Section 5.

#### 3.2 Active Learning

As much as possible, we will try to use **active learning** during face-to-face time. This means trying to make you **do things**, not just sit inactive. We will use different strategies for this, such as:

- Using Learning Catalytics (see section 3.3) during lectures
- Have discussion questions and group activities during tutorials and labs.

For more information about active learning, refer, for instance, to:  
[https://en.wikipedia.org/wiki/Active\\_learning](https://en.wikipedia.org/wiki/Active_learning)  
<https://student.unsw.edu.au/active-learning>



### 3.3 Lectures

There will be essentially two types of lectures:

- Quantitative lectures, where you will learn about fundamental tools and actuarial techniques;
- Qualitative lectures, where we will discuss practice areas, professionalism, and recent issues in the actuarial world.

They are shown in **green** and **yellow** (respectively) in the course schedule; see Section 7. There will also be information sessions held by other Business School staff, and guest lectures (shown in blue in the schedule)

For **quantitative lectures**, I will be teaching materials with detailed slides, examples, and intermediate quizzes using Learning Catalytics. Knowledge will be reinforced and further applied in tutorials. Here the main references will be the lecture notes and tutorial exercises. There may be some prescribed readings from the book as indicated on the lecture slides. Unless announced otherwise on the course website, it is not necessary to do any prior reading.

For **qualitative lectures**, I will be using some lecture slides, but we will mainly be discussing video interviews shot especially for this course (see Section 5.3 below), as well as some other resources such as industry articles. The prescribed readings and resources will be made clear on the course website, and if any prior reading is required this will be announced on the course website. Learning Catalytics will be used for facilitating discussions with the large group, and to see what everyone got from the prior readings before discussing them.

### 3.4 Tutorials

With only one exception, tutorials will focus on the application of concepts taught in the **quantitative lectures**. As a general rule, there will be at least one hour of tutorial per lecture (two for the actuarial techniques discussed in weeks 7, 9 and 11).

Importantly, we invest a lot of resources to offer **small group tutorials**, and this is to maximise interaction, and for students to get the **individualised help** they need. This means that tutorials are not meant to replicate (or summarise) the lecture. If the flow of information is unilateral (the tutor talks for 50 minutes) then this could be done with 350 students in the same way. **You are meant to make the difference** and to make it worthwhile to have 14 groups of 25 instead of 1 group of 350.

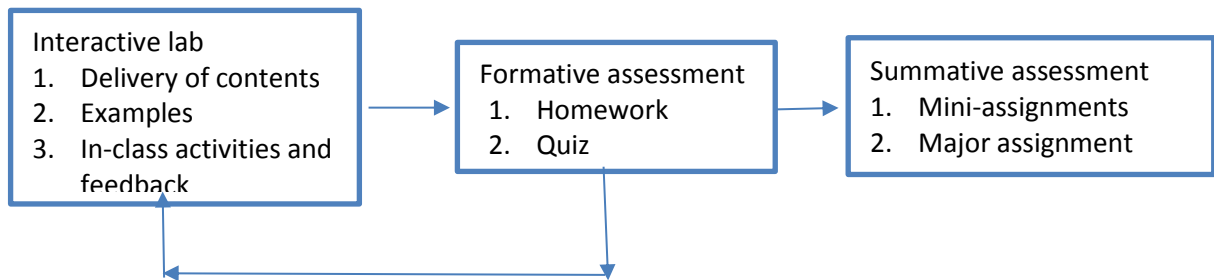
To get the maximum from your tutorial, **it is your responsibility to be prepared and to come to the tutorial with questions you want the tutor to address**. As much as possible (depending on the tutorial topic and room layout) we will try to make you work within your team.

### 3.5 Labs

The labs at providing a foundation in programming, as well as data manipulation and visualisation, with a particular focus on R.

The aims and learning outcomes of the labs, weekly contents, and associated readings are **all mapped in a dedicated spreadsheet** that will be available on the course website.

Labs operate somewhat independently from lectures and tutorials, and while they are taught in small groups, they are small group lectures rather than tutorials.



However, labs are designed to facilitate an **active learning** environment. Each lab covers a range of theoretical contents, as well as learning activities that encourage students' engagement. Learning activities are designed in varying formats and students are expected to reflect on what they have learned, develop a deep understanding of the concepts and apply the contents in practical situations. To facilitate students' participation, R markdown files with examples of R codes are provided, where students are able to modify or extend the existing codes during the practise sessions; see also Section 5.3 below. Generally, no prior reading is required, but students should bring their book (LaDroLi; see Section 5.2), which they should read after the lab.

The active learning process continues after each lab. Students are also encouraged to **learn actively by participating in the formative assessment tasks** (including homework exercises and quizzes). These tasks review the essential concepts and are designed to identify the loopholes of students learning and provide feedbacks for improvement.

The learning outcomes of the R lab series are **validated through mini-assignments**. The mini-assignments are created in such a way that students are required to apply concepts and tools they have learnt in an actuarial context. Sample solutions will be provided to students as feedback.

Note that you will develop **general knowledge of the R software and language, rather than specific actuarial applications using R**. In other words, no prior actuarial knowledge is required, even though examples will be chosen with actuarial studies in mind. Later in the actuarial degree, students will thus be able to focus on specific actuarial applications using R (such as modelling mortality rates, generalised linear regression, etc.) without experiencing difficulties due to poor knowledge of programming and R in particular.

### 3.6 Teams

At the end of the first week we will randomly allocate students to teams within their tutorial (not lab). Teams will normally be of 5 students. Because of enrolment movements, this may vary from 3 to 6. We will not move students between groups unless we exceed those boundaries.

**Team allocations will be announced before Sunday 30 July 11:59pm.** You will be asked to do a group activity in your first tutorial in week 2. Please meet your team members then and sit together accordingly.

**Developing teamwork skills is essential** for your future careers. The actuarial work is very rarely solitary, and being able to collaborate with people you would not necessarily have chosen to work with, or who do not operate in the same way you do (not necessarily worse, just different), is very important. Please try to develop your skillset in this area.

We will give you pointers (Louise Fitzgerald, week 2), and you will also be required to reflect on your experiences.

I strongly encourage to embrace this aspect of the course, and **work with your team on all aspects of it (lectures, tutorials, labs), not only the assignment.** To facilitate this, I am very excited to announce that we will set up team environments within the Office 365 Teams app (which you all have access to as UNSW students). We must be one of the first courses to do so, and I believe the first large course to do so at UNSW. Information will be provided on week 1 (Peter McGuinn).

### 3.7 Learning Catalytics

Learning Catalytics (see <https://learningcatalytics.com/>) allows the lecturer to set tasks for the students to do on their own internet-enabled device (phone, tablet or computer) during (and between) the lectures. Results can then be shown to, and discussed with the whole class immediately. Possible activities include (most relevant to us):

1. Question with open answer: outputs can be a list, or a word cloud;
2. Drawing on blank space, or existing image: outputs can be a grid or superposition of all drawings; see also <https://youtu.be/KrifkpMoHc?t=1m58s> for about 5 seconds
3. Question with multiple options (one or several can be right): output is a %age of correct answers. See also <https://youtu.be/KrifkpMoHc?t=1m22s> for about 10 seconds

Learning Catalytics will be used during all lectures. **Please bring your device and enter the session each week before the lecture starts;** here is the procedure:

- You will access Learning Catalytics via the link in the course Moodle site
- This link will take you to the Pearson Learning Catalytics Page for ACTL1101.
- Click on “Access Learning Catalytics”.
- Once in Learning Catalytics, you will be asked to enter a “Session ID”, which will be projected before the lecture starts.
- This will connect you into the specific Learning Catalytics session being run that day.

You will not need to create an account – this will happen automatically by clicking through from Moodle.

### 3.8 How you will receive feedback about your learning

You will receive feedback about your learning in multiple ways:

- During lectures, by participating in the Learning Catalytics quizzes
- After lectures, by reviewing your lecture notes and participating in the Teams forums and wikis
- Before tutorials, by attempting the exercises to be done prior to the tutorial
- During tutorials, by participating in activities and by interacting with your team and tutor
- After tutorials, by reviewing your notes, and reflecting on your gaps and how to fill them
- During labs, by participating in activities and by interacting with your team and tutor
- After labs, by doing the homework exercises and quizzes
- Throughout, by examining feedback obtained on assessment items; see also Section 4.7.

### 3.9 Your typical week as a student in ACTL1101

The normal workload for a 6 credit course at UNSW is about 10 hours per week.

In a typical week you would do the following activities:

- [0-1 hour] Go through additional online readings as required prior to the lecture
- [2-3 hours\*] Tuesday: attend lecture and consultation afterwards if needed
- [1 hour\*] Before the weekly tutorial: do the homework questions
- [1 hour\*] Attend your weekly tutorial
- [1 hour] Attend your weekly lab
- [1 hour\*] After the lab: Do the lab homework and associated quiz
- [1 hour] Do the individual mini-assignment related to the week prior and submit
- [2-3 hours\*] Revise lecture, tutorial and lab notes and prepare questions if needed; attempt past exam questions; ask and answer questions on the forums; work on the major assignment.

**I strongly suggest that you diarise these activities. I also encourage you to do the starred activities with your team.**

## 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

The table below summarises the assessments for ACTL1101 this session and the weightings of each assessment for the final grade:

Assessment Task	Weighting	Learning Outcomes Assessed	Date
Individual lab mini-assignments (10 in total)	10% (1% each)	5-7	Fridays, 12pm noon (weeks 3 – 12)
Mid-term exam (1 hour)	20%	1 (weeks 2-4)	29 August 2017 2-4pm
Group major assignment	20%	5 to 8	Group task: 29 September 2017 12pm noon on Turnitin Individual task: 6 October 2017 12pm noon on Turnitin
Final Examination (2 hours)	50%	1 to 8	As advised by UNSW examinations

### 4.3 Individual lab mini-assignments

This assessment item relates to the labs, and aims at encouraging students to keep up with the taught materials.

For each lab, you will be given a project as a mini-assignment, where you are required to solve a particular issue with the knowledge from the lab. Each project will be designed

to assess achievement of one particular learning outcome. The project should take around 60 minutes to complete, and **you will be required to submit the following information:**

- **R codes and solutions/results of the project**
- **A discussion of the methodology you have followed, as well as a self-reflection on your experience (e.g. issues you encountered and how you solved them).**

*Note: Here we want to encourage you to reflect on the task. This is how you will prepare most efficiently in actuarial courses: each time you do a task such as tutorial exercise or past exam, ask yourself: (i) what were the skill(s) that was tested here? (ii) how did I do? What did I misunderstand? What knowledge did I have to go back to in order to perform the task? (iii) What is my main take-away? What do I need to add to my cheat sheet for the exam?*

*This also closes the loop of the learning cycle: students need to think about whether they have achieved the learning outcomes.*

The submission deadline is the Friday of the week that follows the lab. For instance, the mini-assignment related to the week 2 labs is due on Friday of week 3.

**Students will be required to formatively assess first.** This is to provide students with opportunities for practicing exercises and receiving feedback. Formative assessment items include homework exercises and on-line quizzes. Homework exercises are designed to provide a list of text book exercises where students need to practice their programming knowledge. Solutions are provided in the text book. Furthermore, on-line quizzes (on moodle) include a mixture of programming and theoretical exercises in the format of multiple choice questions. Students are allowed unlimited attempts, and a feedback message will be provided each time a wrong choice has been made. **Students will only be allowed to submit their mini-assignment if they reach 80% correct answers from all quiz questions for that lab week.** The quiz will be online and the submission box will appear automatically once the required percentage is attained.

Each mini-assignment attracts 1% of the course final mark. There can only be two outcomes, 0% or 1%. In order to gain 1%, you have to

- submit a document on Turnitin in the required format (Word or RMarkdown) on time, and which includes all required elements (solution, methodology and reflection), AND
- your submission needs to show that have made a reasonable attempt at the task.

While Tutors may not check the second condition for all submissions in all weeks, they will check the first condition in all instances.

Of course any academic misconduct (such as plagiarism) will be reported to the School Student Ethics Officer. In this particular instance, if a submission is late, it will attract a mark of 0%.

#### 4.4 Mid-term exam

There will be a mid-term exam held on 29 August 2017, at a venue to be announced later. The mid-term exam is worth 25% of total assessment for the course. Note that the school does not offer supplementary mid-term exams. You may, however, request special consideration (see Section 4.8 below). Students will only be allowed to bring the text "Formulae and Tables for Actuarial Examinations". This must not be annotated.

The mid-term exam will focus exclusively on topics related to the learning outcome 1 (weeks 2-4 and associated tutorials).

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; note that calculators must be “UNSW Approved”. The University will not supply calculators to students for use. 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 partial 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.

#### 4.5 Major group assignment

You will undertake a group assignment to develop your skills in communication, R and teamwork. The main task will be one of exploratory data analysis and visual communication

**You will work with your team; see Section 3.6 above.** Evidence shows that random team allocations lead to most fairness, and also mimics real life where you will have to work in groups that have been formed by others. It also reduces the disadvantage that international or otherwise non-local students have when groups are formed. It also makes you meet new persons, who will be your fellow students in the next few years, and your colleagues in the next many decades.

See also this for interesting thoughts about group work and its assessment:

<https://www.brookes.ac.uk/aske/documents/Brookes%20groupwork%20Gibbs%20Dec%2009.pdf>

##### Scope and assessment:

The Group Assignment will focus:

- Learning outcome 6 “Communicate data insights effectively” (80% of the final mark, PLGOs 1, 2, but also 3)
- Learning outcome 8 “Work effectively in teams” (20% of the final mark, PLGO 4).

**The former will be group based, while the latter will be individual.** A detailed assessment rubric will be provided when the assignment is released early in session. There will be a session to explain how the rubric works and how it will be used for assessment (tentatively scheduled for 5 September 2017).

##### Group contracts:

Groups will then have to nominate a **group leader** by cooptation, whose role will be to coordinate the work, finalise a group contract (see next paragraph) and post it within Teams (online), and submit the assignment before the deadline. Submission remains a joint responsibility so that team members will all be held responsible if the assignment is not submitted on time.

Groups will have to agree on the following items (examples will be made available with the assignment):

- Group leader;
- Tasks and responsibilities of each member;
- Mode(s) of communication between group members;
- Frequency of meetings;
- Project milestones (deadlines for components of the assignment by specific members, etc...);
- Any other item that the group agreed on.



The contract will have to be submitted within Teams. This must be done by the end of week 2. Note that there will be a presentation by Ms Louise Fitzgerald (EDU) on that same week, during the lecture, discussing the contract and providing pointers about teamwork.

### **Submissions:**

Assignments are to be submitted online:

- Group task (report): 29 September 2017 12pm noon on Turnitin
- Individual task (teamwork reflections): 6 October 2017 12pm noon on WebPA.

Information regarding those submissions will be made available on the Moodle course web site.

## **4.6 Final exam**

The final exam is intended to test your knowledge, understanding and application of the course coverage as well as your ability to concisely express yourself. 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.

The final exam will have two parts:

- 45 marks on learning outcomes 5-7 (labs of weeks 2-11), consisted of thirty 1.5 mark multiple choice questions (3 questions per week);
- 55 marks on learning outcomes 1-4, including lectures, tutorials, guest lectures and prescribed resources, consisted of variable length open questions.

## **4.7 How you will receive feedback about your assessments**

You will receive feedback about your assessments in the following ways:

- For individual lab mini-assignments: by comparing your solution with the model solution provided, and by discussing these with your team
- For the mid-term exam:
  - by participating in the tutorial session dedicated to providing feedback on the mid-term exam;
  - by examining your marked copy, comparing it with the model solutions, and by reflecting on areas of improvement;
  - by reading the document that I will provide, which summarises the performance of students as a cohort, and which will include some statistics.
- For the major group assignment:
  - by participating in the lab session dedicated to providing feedback on the assignment;
  - by examining your marked copy, comparing it with the model solutions, and by reflecting on areas of improvement;
  - by reading the document that I will provide, which summarises the performance of students as a cohort, and which will include some statistics.
- For the final exam:
  - by examining the model solutions, and by reflecting on areas of improvement (see also Section 4.9);
  - by reading the document that I will provide, which summarises the performance of students as a cohort, and which will include some statistics. This will be made available on the moodle website after results are communicated to all students.

## 4.8 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.

## 4.9 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](mailto: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

### 5.1 Course website

The website for this course is on Moodle at:

<http://moodle.telt.unsw.edu.au>

The course will use various digital resources, but they all will be linked from moodle.

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). **It is essential that you visit the site regularly (at least weekly) to see any notices posted there by the course coordinator.**

Furthermore, this will be the first large course at UNSW to use the new tool of Microsoft called “Teams”. This will allow us and your team to interact, share documents, collaboratively work on documents without having to track versions, etc. There will be a demonstration during the first lecture.

### 5.2 Textbooks

The **prescribed textbooks** for the course are:

- [LT] Sherris, M. (2010) *Principles of Actuarial Science*, Cengage Publishing
- [RS] Lafaye de Micheaux, P., Drouilhet, P., Liquet, B. (2013) *The R Software*, Springer. Note that this book has been translated into Mandarin and other languages.

Additional, **useful (but non prescribed) references** are:

- Crawley, M. J. (2013) *The R Book*, Second Edition, Wiley  
[A very comprehensive book, but too big and expensive to carry around.]
- Heiberger, R. M., Neuwirth, E. (2009) *R Through Excel*, Springer  
[Explains how to plug R in Excel]
- Zuur, I., and Meesters, A (2009) *A Beginner's Guide to R*, Springer.  
[A smaller, shorter reference book]

### 5.3 Digital resources

The following resources will be made available on the course website. Some will be finalised after the course starts.

#### Industry articles

A selection of industry articles will be made available for some of the lectures. You will be asked to read them in advance.

#### Video scribes

There will be three video scribes to explain threshold concepts:

- Probability mass and density
- Time value of money
- Actuarial reserves

These videos will be watched, discussed and illustrated in class. We will then proceed with building on those concepts.

### Practice area interviews

We have recorded interviews of past UNSW graduates, who now hold senior positions in the industry. The following videos will be made available on the website:

- 1) *Predictive analytics*: Jon Shen, FIAA, Senior Manager, Data Science at Suncorp Chief Data and Transformation Office (Sydney CBD)  
(UNSW Actuarial BCom Co-op and Honours class 1 with University Medal, graduated end 2010)
- 2) *Risk Management*: Gloria Yu, FIAA, Director at Deloitte Actuaries and Consultants (Sydney CBD)  
(UNSW Actuarial BCom Co-op, graduated end 2004)
- 3) *General Insurance*: Luke Cassar, FIAA, CERA, Senior Consultant at Finity Consulting (Sydney CBD)  
(UNSW Actuarial BCom Co-op and Honours class 1, graduated end 2010)
- 4) *Health*: Ignatius Li, Health Actuary, Director at Deloitte Actuaries and Consultants (Sydney CBD)  
(UNSW Actuarial BCom Co-op, graduated end 2011)
- 5) *Life Insurance*: TBC
- 6) *Superannuation*: Anthony Saliba, FIAA, Senior Actuary in the Superannuation & Investments division of CommInsure  
(UNSW Actuarial BCom Co-op, graduated end 2009)
- 7) *Investments*: TBC

We will watch those (short) videos in class and discuss them. I will be able to explain some of the things they say, and add to them.

Additionally, we will also have an interview on professional ethics:

- 8) *Professional ethics*: Kevin Allport, FIAA, Convenor of the Professional Conduct Committee, Former Appointed Actuary at MLC.

**All those videos will be discussed in class are assessable.**

### Research interviews

Staff from the School of Risk and Actuarial Studies will be interviewed to describe their research areas.

### Lab R markdown files

You will receive the source file for all the lab teaching materials. This is an R markdown file (which can be compiled directly from R Studio). This presents the following advantages:

- Firstly, it allows flexibility for you to choose how you would like to save the files – you can generate pdf articles, word documents even html files from R markdown files.
- Secondly, a R markdown file includes both the contents of a lab and the R codes. You will be able to receive the R codes for examples via the R markdown file. This means that you can replicate the examples yourself during and after class.
- Thirdly, you will be able to run a large block of R codes by simply pressing a Run button at the corresponding section R codes. This will save you time from writing your own codes or copying pasting codes. This allows us to incorporate more interactive learning activities.

## 5.4 Formulae & Tables

The only text students are allowed to bring into the examinations for the actuarial courses 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>

## 5.5 The Actuaries Institute

The Actuaries Institute allows students to become 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

<https://www.actuaries.asn.au/becoming-an-actuary/becoming-a-university-subscriber>

## 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 myExperience survey is one of the ways in which student evaluative feedback is gathered. In this course, we will seek your feedback through end of semester myExperience responses and other informal forums.

As a result of student feedback, industry feedback, and school L&T strategic plan, the software R is now fully taught and assessed with a new set of labs. From this cohort on, R will be assumed to be mastered by students, and will be used and assessed in each of the future actuarial courses. Furthermore, we are introducing the weekly quizzes to help and motivate students with keeping up-to-date, and to include assessment on R throughout the course. Note that at the same time, a level 3 course, ACTL3142 Actuarial Data and Analysis, has been introduced in the suite of ACTL courses, with advanced data analytics tools. Guest lecturers are invited. Finally, the development and assessment of team work will be strengthened in the group assignment.

Feedback from 2016 students indicated that they wanted more resources, and a different assessment structure. We have done so, and in fact have completely rejigged the course to give more emphasis and resources on practice areas, and the “big picture”. Labs are now at their version 2.0 level. All the digital resources described under 5.3 are new.

## 7 COURSE SCHEDULE

Date	Week	Lectures	Tutorials	Labs
25-Jul-17	1	Course Introduction Introduction to R 3:30pm: Peter McGuinn (Business Learning) on	No tutorial in week 1	No lab in week 1
1-Aug-17	2	Probability and Statistics I 3:40pm: Louise Fitzgerald (EDU) on on Teamwork: Contract and	Team workshop on statistical distributions	Algorithms and pseudocodes
8-Aug-17	3	Probability and Statistics I	Probability and Statistics I	Introduction to R and R Studio
15-Aug-17	4	Financial mathematics	Probability and Statistics I	Data structures, import, export, and control flow in
22-Aug-17	5	Actuarial profession and professional ethics 3:10pm: Guest lecture: Chao Qiao, FIAA, PwC, Member of the	Financial mathematics	Vectorisation, operations and distributions in R
29-Aug-17	6	<b>Mid-term exam</b>	Q&A/ Professional ethics	Data manipulation and statistical summaries in R
5-Sep-17	7	Foundations of Risk and Insurance 3:40pm: EDU on Teamwork: assessment rubric	<b>Mid-term exam feedback and solutions</b>	Visualisation: theory
12-Sep-17	8	2:05pm: Guest lecture: Robert Thomson, FIAA, Head of Actuarial Services at APRA Regulation Risk Management	Risk and Insurance I	Basic visualisation tools and management of plots in R
19-Sep-17	9	Foundations of Life Insurance Techniques	Risk and Insurance I	Advanced visualisation with ggplot2 and Shiny
26-Sep-17		University break <b>29 September, 12pm: Assignment due (group part)</b>	No tutorial during break	No lab during break
3-Oct-17	10	Life Insurance, Wealth Management, and	Life techniques I	R functions and matrix operations
10-Oct-17	11	Foundations of General Insurance Techniques	Life techniques I	Numerical and symbolic methods, and efficient calculations in R
17-Oct-17	12	General Insurance and Health	GI techniques I	Introduction to LaTeX (not assessable)
24-Oct-17	13		GI techniques I	<b>Assignment feedback</b>