



**UNSW**

## UNSW Course Outline

# ACTL1101 Introduction to Actuarial Studies - 2024

Published on the 13 May 2024

## General Course Information

**Course Code :** ACTL1101

**Year :** 2024

**Term :** Term 2

**Teaching Period :** T2

**Is a multi-term course? :** No

**Faculty :** UNSW Business School

**Academic Unit :** School of Risk and Actuarial Studies

**Delivery Mode :** In Person

**Delivery Format :** Standard

**Delivery Location :** Kensington

**Campus :** Sydney

**Study Level :** Undergraduate

**Units of Credit :** 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

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.

## Course Aims

This course is offered as part of the first year core in the Bachelor of Actuarial Studies and dual degrees. The course is a prerequisite, along with MATH1251, for the courses ACTL2111 Financial Mathematics for Actuaries, and ACTL2131 Probability and Mathematical Statistics.

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

# Course Learning Outcomes

Course Learning Outcomes	Program learning outcomes
CLO1 : Evaluate and apply basic principles of probability, statistics and financial mathematics	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO2 : Problem Solving</li> </ul>
CLO2 : Evaluate the fundamental principles underlying risk management and insurance	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO2 : Problem Solving</li> </ul>
CLO3 : Evaluate and apply fundamental actuarial mathematics techniques	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO2 : Problem Solving</li> </ul>
CLO4 : Describe how the actuarial profession is organised, its code of conduct, its main practice areas, as well as its current challenges and opportunities	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO5 : Responsible Business Practice</li> <li>• PLO6 : Global and Cultural Competence</li> </ul>
CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO2 : Problem Solving</li> </ul>
CLO6 : Communicate data insights effectively	<ul style="list-style-type: none"> <li>• PLO3 : Business Communication</li> </ul>
CLO7 : Perform efficient computation, as well as manipulate data, in R	<ul style="list-style-type: none"> <li>• PLO1 : Business Knowledge</li> <li>• PLO2 : Problem Solving</li> </ul>

Course Learning Outcomes	Assessment Item
CLO1 : Evaluate and apply basic principles of probability, statistics and financial mathematics	<ul style="list-style-type: none"> <li>• Weekly Formative Discussion Forum</li> <li>• Quiz</li> </ul>
CLO2 : Evaluate the fundamental principles underlying risk management and insurance	<ul style="list-style-type: none"> <li>• Final Examination (2 hours)</li> <li>• Weekly Formative Discussion Forum</li> </ul>
CLO3 : Evaluate and apply fundamental actuarial mathematics techniques	<ul style="list-style-type: none"> <li>• Final Examination (2 hours)</li> <li>• Weekly Formative Discussion Forum</li> </ul>
CLO4 : Describe how the actuarial profession is organised, its code of conduct, its main practice areas, as well as its current challenges and opportunities	<ul style="list-style-type: none"> <li>• Quiz</li> <li>• Final Examination (2 hours)</li> </ul>
CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Quiz</li> <li>• Weekly Formative Discussion Forum</li> <li>• Final Examination (2 hours)</li> </ul>
CLO6 : Communicate data insights effectively	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Weekly Formative Discussion Forum</li> <li>• Final Examination (2 hours)</li> </ul>
CLO7 : Perform efficient computation, as well as manipulate data, in R	<ul style="list-style-type: none"> <li>• Assignment</li> <li>• Final Examination (2 hours)</li> </ul>

# Learning and Teaching Technologies

Moodle - Learning Management System | EdStem

## Learning and Teaching in this 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, the more you will learn and get from the course. Interaction can occur in class, in tutorials, in labs, during consultation, on online forums, etc.

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

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
Weekly Formative Discussion Forum Assessment Format: Individual Short Extension: Yes (7 days)	30%	
Quiz Assessment Format: Individual	10%	Start Date: Not Applicable Due Date: Not Applicable
Assignment Assessment Format: Individual Short Extension: Yes (7 days)	20%	Start Date: Not Applicable Due Date: Not Applicable
Final Examination (2 hours) Assessment Format: Individual	40%	

## Assessment Details

### Weekly Formative Discussion Forum

#### Assessment Overview

These are aimed at encouraging students to keep up with the course materials.

#### Course Learning Outcomes

- CLO1 : Evaluate and apply basic principles of probability, statistics and financial mathematics
- CLO2 : Evaluate the fundamental principles underlying risk management and insurance
- CLO3 : Evaluate and apply fundamental actuarial mathematics techniques
- CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)

- CLO6 : Communicate data insights effectively

#### Detailed Assessment Description

This course includes weekly formative activities, such as online discussion questions and class discussions, designed to reinforce the concepts learned each week. These activities encourage students to stay engaged with the course materials, helping them identify areas for improvement and enhancing their overall learning experience.

A task due every week may sound like a lot, but each task will be reasonable in terms of the effort and time needed to complete. The purpose of those tasks is to motivate students to keep up with the content, to allow them to test their learning along the way, and to receive feedback. They are intended as an opportunity to learn, not as a burden.

**Warning:** while students are encouraged to help each other, those weekly questions are **individual assignments** and therefore **academic misconduct will be treated very seriously**. Any academic misconduct (such as plagiarism) will be reported to the School Student Integrity Adviser. It is far better not to submit, rather than doing the wrong thing (which of course you should never do!). Furthermore, the plagiarism software is very good, hence **you have very high chances of being caught, if you do something you should not do.**

## Quiz

#### Assessment Overview

These are to assess the learning outcomes.

#### Course Learning Outcomes

- CLO1 : Evaluate and apply basic principles of probability, statistics and financial mathematics
- CLO4 : Describe how the actuarial profession is organised, its code of conduct, its main practice areas, as well as its current challenges and opportunities
- CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)

#### Detailed Assessment Description

There will be a in-person quiz held in Week 5, worth 10% of the total mark for the course. The online quiz will focus exclusively on topics related to the Theory of weeks 1-2-3, and associated tutorials. The quiz will be formative: a good attempt (even with minor mistakes) will grant students full marks. The purpose of the quiz is to test knowledge acquired thus far in the term, provide feedback to students in preparation for the final exam, and allow them to adjust their studying strategy if improvements are needed.

### Assessment Length

1 hour

## Assignment

### Assessment Overview

An individual assignment task involving application of course concepts.

### Course Learning Outcomes

- CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)
- CLO6 : Communicate data insights effectively
- CLO7 : Perform efficient computation, as well as manipulate data, in R

### Detailed Assessment Description

The main assignment (attracts 20% of the total mark) will have a focus on R programming (but some "Theory" knowledge will be needed as well). It is meant for students to demonstrate a more extensive knowledge their R programming abilities, with a particular emphasis on the content not assessed through previous weekly online questions.

## Final Examination (2 hours)

### Assessment Overview

The examination will aim to assess the achievement of the learning course outcomes.

### Course Learning Outcomes

- CLO2 : Evaluate the fundamental principles underlying risk management and insurance
- CLO3 : Evaluate and apply fundamental actuarial mathematics techniques
- CLO4 : Describe how the actuarial profession is organised, its code of conduct, its main practice areas, as well as its current challenges and opportunities
- CLO5 : Interpret and create basic algorithms and control loops (in R and in pseudocode)
- CLO6 : Communicate data insights effectively
- CLO7 : Perform efficient computation, as well as manipulate data, in R

### Detailed Assessment Description

The final exam is intended to test students' knowledge, understanding and application of all the "Theory" component of the course, as well as their ability to concisely express themselves. This final examination will be a two hour in-person exam.

### Assessment Length

2 hours

### Assignment submission Turnitin type

Not Applicable

## General Assessment Information

As a student at UNSW you are expected to display [academic integrity](#) in your work and interactions. Where a student breaches the [UNSW Student Code](#) with respect to academic integrity, the University may take disciplinary action under the Student Misconduct Procedure. To assure academic integrity, you may be required to demonstrate reasoning, research and the process of constructing work submitted for assessment.

To assist you in understanding what academic integrity means, and how to ensure that you do comply with the UNSW Student Code, it is strongly recommended that you complete the [Working with Academic Integrity](#) module before submitting your first assessment task. It is a free, online self-paced Moodle module that should take about one hour to complete.

### Grading Basis

Standard

### Requirements to pass course

In order to pass this course students must:

- Achieve a composite mark of at least 50 out of 100
- Engage actively in course learning activities and attempt all assessment requirements
- Meet any additional requirements specified in the assessment details
- Meet the specified attendance requirements of the course

# Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Lecture	Probability
	Lecture	Introduction to R
	Tutorial	Probability
Week 2 : 3 June - 9 June	Lecture	Financial Math and Actuarial Management
	Lecture	Exploratory Statistics
	Tutorial	Financial Math
Week 3 : 10 June - 16 June	Lecture	Mortality and Life Annuities
	Lecture	Functions and Simple Plotting
	Tutorial	Mortality and Life Annuities
Week 4 : 17 June - 23 June	Lecture	Economics of Risk and Risk Management Systems
	Lecture	Advanced Plotting
	Tutorial	Economics of Risk and Risk Management Systems
Week 5 : 24 June - 30 June	Lecture	Statistical Machine Learning and AI Techniques
	Lecture	Regression Modeling
	Tutorial	In-person quiz
Week 6 : 1 July - 7 July	Module	Flexibility week: no lecture, no tutorials, no new content!
Week 7 : 8 July - 14 July	Lecture	Life Insurance
	Lecture	Introduction to Banking
	Tutorial	Regression Modeling
Week 8 : 15 July - 21 July	Lecture	General Insurance
	Lecture	Guest Lecturer
	Tutorial	Life Insurance
Week 9 : 22 July - 28 July	Lecture	Retirement, Health and Disability Insurance
	Lecture	Actuarial Practice
	Tutorial	General Insurance
Week 10 : 29 July - 4 August	Lecture	Emerging topics, Regulation and Ethics
	Lecture	What's on the Exam?
	Tutorial	Revision

## Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

## General Schedule Information

Note: for more information on the UNSW academic calendar and key dates including study period, exam, supplementary exam and result release, please visit: <https://student.unsw.edu.au/new-calendar-dates>

## Course Resources

### Prescribed Resources

Course website

The website for this course is on Moodle. The course will use various digital resources (and notably a "Ed Forum" for questions), 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, as well as Ed, regularly (at least weekly) to see any notices posted there by the course coordinator.

## Textbooks

The highly recommended (but not 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 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]

## Digital resources

The following resources will be made available on the course website.

### Theory Slides

Slides make up the content of the "theory component" (green) of the course.

### Industry articles, video interviews, podcasts

A selection of articles, videos and podcasts all around the theme of "Actuarial Practice" will be made available on Moodle. Those will constitute the main resources for the Actuarial Practice (yellow) component of the course.

### R programming slides + videos

Slides covering the "orange" content (R programming) of the course will be available on the Ed Forum. Pre-recorded videos which go through the content of those slides will also be made

available. The reason why we provide the R slides on the Ed forum is that the Ed forum can conveniently be used to run R code (without having to install anything).

### Formulae & Tables

In traditional exams, the only text student are allowed to bring into the examinations actuarial courses is the text "Formulae and Tables for Actuarial Examinations". 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](#). This is not mandatory, but highly recommended (as you will surely use it in many other actuarial courses in the future).

### 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. [Click here to sign up](#).

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Xiao Xu		651		Monday after class	Yes	Yes

## Other Useful Information

### Academic Information

### COURSE POLICIES AND SUPPORT

The Business School expects that you are familiar with the contents of this course outline and the UNSW and Business School learning expectations, rules, policies and support services as listed below:

- Program Learning Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Protocol for Viewing Final Exam Scripts
- Student Learning Support Services

Further information is provided on the [key policies and support](#) page.

Students may not circulate or post online any course materials such as handouts, exams, syllabi or similar resources from their courses without the written permission of their instructor.

## STUDENT LEARNING OUTCOMES

The Course Learning Outcomes (CLOs) – under the Outcomes tab – are what you should be able to demonstrate by the end of this course, if you participate fully in learning activities and successfully complete the assessment items.

CLOs also contribute to your achievement of the Program Learning Outcomes (PLOs), which are developed across the duration of a program. PLOs are, in turn, directly linked to [UNSW graduate capabilities](#). More information on Coursework PLOs is available on the [key policies and support](#) page. For PG Research PLOs, including MPDBS, please refer to the [UNSW HDR Learning Outcomes](#).

## Academic Honesty and Plagiarism

As a student at UNSW you are expected to display [academic integrity](#) in your work and interactions. Where a student breaches the [UNSW Student Code](#) with respect to academic integrity, the University may take disciplinary action under the Student Misconduct Procedure. To assure academic integrity, you may be required to demonstrate reasoning, research and the process of constructing work submitted for assessment.

To assist you in understanding what academic integrity means, and how to ensure that you do comply with the UNSW Student Code, it is strongly recommended that you complete the [Working with Academic Integrity](#) module before submitting your first assessment task. It is a free, online self-paced Moodle module that should take about one hour to complete.

## Submission of Assessment Tasks

### SPECIAL CONSIDERATION

You can apply for special consideration when illness or other circumstances beyond your control interfere with your performance in a specific assessment task or tasks, including online exams. Students studying remotely who have exams scheduled between 10pm and 7am local time, are also able to apply for special consideration to sit a supplementary exam at a time outside of

these hours.

Special consideration is primarily intended to provide you with an extra opportunity to demonstrate the level of performance of which you are capable. To apply, and for further information, see Special Consideration on the UNSW [Current Students](#) page.

Special consideration applications will be assessed centrally by the Case Review Team, who will update the online application with the outcome and add any relevant comments. The change to the status of the application immediately sends an email to the student and to the assessor with the outcome of the application.

Please note the following:

1. Applications can only be made through Online Services in myUNSW (see the UNSW [Current Students](#) page). Applications will not be accepted by teaching staff. The lecturer-in-charge/ course coordinator will be automatically notified when your application is processed.
2. Applying for special consideration does not automatically mean that you will be granted a supplementary exam or other concession.
3. If you experience illness or misadventure in the lead up to an exam or assessment, you must submit an application for special consideration, either prior to the examination taking place, or prior to the assessment submission deadline, except where illness or misadventure prevent you from doing so.
4. If your circumstances stop you from applying before your exam or assessment due date, you must apply within 3 working days of the assessment or the period covered by your supporting documentation.
5. Under the UNSW Fit To Sit/Submit rule, if you sit the exam/submit an assignment, you are declaring yourself well enough to do so and are cannot subsequently apply for special consideration.
6. If you become unwell on the day of – or during – an exam, you must stop working on your exam, advise your course coordinator or tutor and provide a medical certificate dated within 24 hours of the exam, with your special consideration application. For online exams, you must contact your course coordinator or tutor immediately via email, Moodle or chat and advise them you are unwell and submit screenshots of your conversation along with your medical certificate and application.
7. Special consideration requests do not allow the awarding of additional marks to students.

Further information on Business School policy and procedure can be found under "Special Consideration" on the [key policies and support](#) page.

## LATE SUBMISSION PENALTIES

For assessments other than examinations, late submission will incur a penalty of 5% per day or part thereof (including weekends) from the due date and time. An assessment will not be accepted after 5 days (120 hours) of the original deadline unless special consideration has been approved. An assignment is considered late if the requested format, such as hard copy or electronic copy, has not been submitted on time or where the 'wrong' assignment has been submitted.

For assessments which account for 10% or less of the overall course grade, and where answers are immediately discussed or debriefed, the LIC may stipulate a different penalty. Details of such late penalties will be available on the course Moodle page.

## FEEDBACK ON YOUR ASSESSMENT TASK PERFORMANCE

Feedback on student performance from formative and summative assessment tasks will be provided to students in a timely manner. Assessment tasks completed within the teaching period of a course, other than a final assessment, will be assessed and students provided with feedback, with or without a provisional result, within 10 working days of submission, under normal circumstances. Feedback on continuous assessment tasks (e.g. laboratory and studio-based, workplace-based, weekly quizzes) will be provided prior to the midpoint of the course.

## Faculty-specific Information

### PROTOCOL FOR VIEWING FINAL EXAM SCRIPTS

UNSW students have the right to view their final exam scripts, subject to a small number of very specific exemptions. The UNSW Business School has set a [protocol](#) under which students may view their final exam script. Individual schools within the Faculty may also set up additional local processes for viewing final exam scripts, so it is important that you check with your School.

If you are completing courses from the following schools, please note the additional school-specific information:

- Students in the **School of Accounting, Auditing & Taxation** who wish to view their final examination script should also refer to [this page](#).
- Students in the **School of Banking & Finance** should also refer to [this page](#).
- Students in the **School of Information Systems & Technology Management** should also refer to [this page](#).

## COURSE EVALUATION AND DEVELOPMENT

Feedback is regularly sought from students and continual improvements are made based on this feedback. At the end of this course, you will be asked to complete the [myExperience survey](#), which provides a key source of student evaluative feedback. Your input into this quality enhancement process is extremely valuable in assisting us to meet the needs of our students and provide an effective and enriching learning experience. The results of all surveys are carefully considered and do lead to action towards enhancing educational quality.

## 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.

## TEACHING TIMES AND LOCATIONS

Please note that teaching times and locations are subject to change. Students are strongly advised to refer to the [Class Timetable website](#) for the most up-to-date teaching times and locations.