ACST3060

Quantitative Methods for Risk Analysis

Session 2, Weekday attendance, North Ryde 2021

Department of Actuarial Studies and Business Analytics

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff
Unit convenor and lecturer
Jackie Li
jackie.li@mq.edu.au
4ER, level 7
Wednesdays 12pm-1pm during teaching weeks

Credit points
10

Prerequisites
ACST358 or ACST3058

Corequisites

Co-badged status

Unit description
This unit explores the use of statistical models in insurance: loss distributions with and without risk sharing, compound distributions and their applications in risk modelling, introduction to copulas, extreme value theory. The concepts underlying time series models and actuarial applications of time series models are also studied. Students gaining a weighted average of credit across all of ACST3058, ACST3060 and the CS2-related components of the assessment in ACST3059 (minimum mark of 60% on all three components) will satisfy the requirements for exemption from the professional subject CS2 of the Actuaries Institute.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Model insurance claims using loss distributions.

ULO2: Construct risk models with frequency and severity distributions.

ULO3: Use premium principles to price insurance products.

ULO4: Model dependence and extreme events by copulas and extreme value theory.

ULO5: Apply time series models to financial and economic variables.

General Assessment Information

Assessment criteria for all assessment tasks will be provided on the unit iLearn site.

It is the responsibility of students to view their marks for each within-session-assessment on iLearn within 20 days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment tasks (not including the final exam mark) will not be addressed.

Late submissions of assessments

Sometimes unavoidable circumstances occur that might prevent you from submitting an assessment on time and, in that case, you may be eligible to lodge a Special Consideration request.

Unless a Special Consideration request has been submitted and approved, please note that no extensions to assessment deadlines will be granted. Assessments that are submitted late will attract a late penalty:

1. There will be a deduction of 10% of the total available marks for each 24 hour period or part thereof that the submission is late.
2. No assessment will be accepted more than 72 hours after the original due date and time (incl. weekends).
3. No late submissions will be accepted for timed assessments (e.g., quizzes, online tests) or for tasks with a weighting of 10% or less.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment	20%	No	Week 3 and Week 12
Class Test	20%	No	Week 7
Final Exam	60%	No	University Examination Period

Assignment

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 20 hours
Due: **Week 3 and Week 12**
Weighting: **20%**

There are two individual written assignments on problem solving using R.

On successful completion you will be able to:

- Model insurance claims using loss distributions.
- Construct risk models with frequency and severity distributions.
- Use premium principles to price insurance products.
- Model dependence and extreme events by copulas and extreme value theory.

Class Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 20 hours
Due: **Week 7**
Weighting: **20%**

The test will be approximately 90 minutes, to be held during class time.

On successful completion you will be able to:

- Model insurance claims using loss distributions.
- Construct risk models with frequency and severity distributions.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 28 hours
Due: **University Examination Period**
Weighting: **60%**

The final examination will be a three-hour written paper with ten minutes reading time, to be held during the University Examination period.

On successful completion you will be able to:

- Model insurance claims using loss distributions.
- Construct risk models with frequency and severity distributions.
- Use premium principles to price insurance products.
- Model dependence and extreme events by copulas and extreme value theory.
- Apply time series models to financial and economic variables.

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

The timetable for classes can be found on:

https://timetables.mq.edu.au/2021/

Lecture notes are available for download from iLearn. You will need to print the lecture notes and bring them to classes to complete.

The major references include:

Dickson, D. (2016). *Insurance Risk and Ruin*. Cambridge University Press.

Tsay, R. (2002). *Analysis of Financial Time Series*. John Wiley & Sons, Inc.

Nelsen, R. (2006). *An Introduction to Copulas*. Springer-Verlag New York.

Embrechts, P., Kluppelberg, C., Mikosch, T. (1997). *Modelling Extremal Events for Insurance and Finance*. Springer-Verlag Berlin Heidelberg.

Students will be required to use iLearn, R, Excel, PDF, Word, and a non-programmable calculator.

Unit Schedule

Week	Topic
1	Loss Models
2	Loss Models
3	Loss Models
4	Risk Models
5	Risk Models
6	Risk Models
7	Premium Principles
	Session Break

8	Extreme Value Theory
9	Extreme Value Theory
10	Copulas
11	Copulas
12	Time Series Models
13	Time Series Models

* TBC in lectures

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Supplementary exams

Information regarding supplementary exams, including dates, is available at:

http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/disruption_to_studies

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.