ACST3060
Quantitative Methods for Risk Analysis
Session 2, In person-scheduled-weekday, North Ryde 2023
Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff
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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
Late Assessment Submission Penalty (written assessments)
Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of ‘0’ will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11.55pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submissions of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>15%</td>
<td>No</td>
<td>Week 12</td>
</tr>
<tr>
<td>Final Exam</td>
<td>60%</td>
<td>No</td>
<td>Exams Period</td>
</tr>
<tr>
<td>Class Tests</td>
<td>25%</td>
<td>No</td>
<td>Week 6 and Week 10</td>
</tr>
</tbody>
</table>

### Assignment

Assessment Type ¹: Quantitative analysis task  
Indicative Time on Task ²: 15 hours  
Due: **Week 12**  
Weighting: **15%**

*There is an individual written assignment 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.

### Final Exam

Assessment Type ¹: Examination  
Indicative Time on Task ²: 28 hours  
Due: **Exams 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.

### Class Tests

**Assessment Type**: Quiz/Test  
**Indicative Time on Task**: 25 hours  
**Due**: Week 6 and Week 10  
**Weighting**: 25%

Two class tests will 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.

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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

There is no mandatory textbook. Please refer to the iLearn website for more information.

### 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
- Assessment Procedure
- Complaints Resolution 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

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.
Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.