ACST8083
Actuarial Statistics
Session 1, In person-scheduled-weekday, North Ryde 2024
Department of Actuarial Studies and Business Analytics

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General Information

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Credit points
10

Prerequisites
STAT806 or STAT810 or STAT8310

Corequisites

Co-badged status
ACST3061

Unit description
This unit examines the use of statistical models in the general insurance context. Applications will include linear models and generalised linear models and Bayesian statistics including Credibility Theory. Students gaining a credit average across both ACST8083 and STAT8310 (minimum mark of 60 on both units) will satisfy the requirements for exemption from the professional subject CS1 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:

UL01: Apply the method of maximum likelihood estimation in a range of contexts and understand associated statistical distribution theory.

UL02: Explain and apply both simple and multiple linear regression methodology.

UL03: Develop an understanding of the theory and practice of generalised linear modelling (GLMs).

UL04: Explain and apply the fundamental concepts of Bayesian statistics.

UL05: Apply credibility theory to insurance problems.
ULO6: Apply these statistical techniques in solving practical insurance problems.

**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>Class Test</td>
<td>20%</td>
<td>No</td>
<td>Week 7</td>
</tr>
<tr>
<td>Assignment 1</td>
<td>10%</td>
<td>No</td>
<td>Week 9</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>10%</td>
<td>No</td>
<td>Week 12</td>
</tr>
<tr>
<td>Final Exam</td>
<td>60%</td>
<td>No</td>
<td>During university examination period</td>
</tr>
</tbody>
</table>

**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:

- Apply the method of maximum likelihood estimation in a range of contexts and understand associated statistical distribution theory.
- Explain and apply both simple and multiple linear regression methodology.
- Develop an understanding of the theory and practice of generalised linear modelling (GLMs).
• Apply these statistical techniques in solving practical insurance problems.

Assignment 1
Assessment Type 1: Quantitative analysis task
Indicative Time on Task 2: 10 hours
Due: Week 9
Weighting: 10%

This is an individual assignment which focuses on problem solving using R.

On successful completion you will be able to:
• Apply the method of maximum likelihood estimation in a range of contexts and understand associated statistical distribution theory.
• Explain and apply both simple and multiple linear regression methodology.
• Develop an understanding of the theory and practice of generalised linear modelling (GLMs).
• Apply these statistical techniques in solving practical insurance problems.

Assignment 2
Assessment Type 1: Quantitative analysis task
Indicative Time on Task 2: 10 hours
Due: Week 12
Weighting: 10%

This is an individual assignment which focuses on problem solving using R.

On successful completion you will be able to:
• Explain and apply the fundamental concepts of Bayesian statistics.
• Apply credibility theory to insurance problems.
• Apply these statistical techniques in solving practical insurance problems.

Final Exam
Assessment Type 1: Examination
Indicative Time on Task 2: 28 hours
Due: During university examination period
Weighting: 60%
The final examination will be closed book, 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:

- Apply the method of maximum likelihood estimation in a range of contexts and understand associated statistical distribution theory.
- Explain and apply both simple and multiple linear regression methodology.
- Develop an understanding of the theory and practice of generalised linear modelling (GLMs).
- Explain and apply the fundamental concepts of Bayesian statistics.
- Apply credibility theory to insurance problems.
- Apply these statistical techniques in solving practical insurance problems.

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**

Please refer to iLearn

**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](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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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.

- **Workshops**
- **Chat with a WriteWISE peer writing leader**
- **Access StudyWISE**
- **Upload an assignment to Studiosity**
- **Complete the 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**
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/](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](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/). The policy applies to all who connect to the MQ network including students.

Unit information based on version 2024.02 of the Handbook.