ACST8083
Actuarial Statistics
Session 1, Special circumstances 2021

Department of Actuarial Studies and Business Analytics

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Notice
As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit’s iLearn space or consult your unit convenor.
General Information

Unit convenor and teaching staff
Unit Convenor
Hanlin Shang
hanlin.shang@mq.edu.au

Credit points
10

Prerequisites
STAT810 or STAT8310 or STAT806

Corequisites

Co-badged status

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://students.mq.edu.au/important-dates

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

- **ULO1**: Apply the method of maximum likelihood estimation in a range of contexts and understand associated statistical distribution theory.
- **ULO2**: Explain and apply both simple and multiple linear regression methodology.
- **ULO3**: Develop an understanding of the theory and practice of generalised linear modelling (GLMs).
- **ULO4**: Explain and apply the fundamental concepts of Bayesian statistics.
- **ULO5**: Apply credibility theory to insurance problems.
- **ULO6**: Apply these statistical techniques in solving practical insurance problems.
**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 and extensions**

Tasks 10% or less – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Tasks above 10% - No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

**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 Exam 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.
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 Exam 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 Learning Skills Unit 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 the university timetable at https://timetables.mq.edu.au/2021/ for class times.

All other information will be available on iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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** *(Note: The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

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

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central *(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central)*.

### 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

### 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/)

### 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 Enquiry Service

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
Equity 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.

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.