



ACST8044

Statistical Learning for Risk Modelling I

Session 1, In person-scheduled-weekday, North Ryde 2025

Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff Ken Siu ken.siu@mq.edu.au
Credit points 10
Prerequisites STAT8310
Corequisites
Co-badged status
Unit description This unit begins with coverage of the key concepts of statistical learning, the basics of data analysis and modelling. Applications will include linear models and generalised linear models. The concepts underlying time series models and actuarial applications of time series models are also studied. Students performing satisfactorily well in both ACST8044 and ACST8045 will meet the requirements to earn credit from Exam SRM of the Society of Actuaries.

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: Demonstrate an understanding of the key concepts of statistical learning

ULO2: Explain the various concepts related to linear models and generalized linear models and perform related calculations, analyses and interpretations.

ULO3: Compare and contrast between linear models and other popular methods such as k-nearest neighbour, lasso and ridge regression.

ULO4: Demonstrate an understanding on the various concepts and components of time series models and perform related calculations and interpretations.

General Assessment Information

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

Name	Weighting	Hurdle	Due
Class test	20%	No	10/04/2025
Assignment	20%	No	30/05/2025
Final Exam	60%	No	Exam Period

Class test

Assessment Type [1](#): Quiz/Test

Indicative Time on Task [2](#): 10 hours

Due: **10/04/2025**

Weighting: **20%**

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

On successful completion you will be able to:

- Demonstrate an understanding of the key concepts of statistical learning
- Explain the various concepts related to linear models and generalized linear models and perform related calculations, analyses and interpretations.

Assignment

Assessment Type [1](#): Quantitative analysis task

Indicative Time on Task [2](#): 20 hours

Due: **30/05/2025**

Weighting: **20%**

Problem-solving questions requiring detailed solutions using R.

On successful completion you will be able to:

- Explain the various concepts related to linear models and generalized linear models and perform related calculations, analyses and interpretations.
- Compare and contrast between linear models and other popular methods such as k-nearest neighbour, lasso and ridge regression.

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 28 hours

Due: **Exam Period**

Weighting: **60%**

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

On successful completion you will be able to:

- Demonstrate an understanding of the key concepts of statistical learning
- Explain the various concepts related to linear models and generalized linear models and perform related calculations, analyses and interpretations.
- Compare and contrast between linear models and other popular methods such as k-nearest neighbour, lasso and ridge regression.
- Demonstrate an understanding on the various concepts and components of time series models and perform related calculations and interpretations.

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 unit will be delivered by weekly seminars. The unit material will be available for download

from iLearn. Students will be required to use iLearn, R, PDF, Excel, Word, a non-programmable calculator and other resources to be mentioned on iLearn. A recommended reading is:

Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani (2021) An Introduction to Statistical Learning with Applications in R. Springer: New York.

Some other references or recommended reading materials will be introduced on the iLearn page whenever appropriate.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.mq.edu.au) (<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) (<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) (<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 connect.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/>

Academic Success

[Academic Success](#) 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](#)
- [Ask a Librarian](#)

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 the [Service Connect Portal](#), 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.

Unit information based on version 2025.03 of the [Handbook](#)