



ACST8045

Statistical Learning for Risk Modelling II

Session 2, In person-scheduled-weekday, North Ryde 2026

Department of Actuarial Studies and Business Analytics

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Policies and Procedures</u>	6

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff Yanlin Shi yanlin.shi@mq.edu.au
Credit points 10
Prerequisites ACST8044 and STAT8310
Corequisites
Co-badged status
Unit description This unit begins with common methods of assessing model accuracy in statistical learning. This unit examines: principal components analysis, resampling methods, tree-based methods and clustering methods. 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 various concepts related to the assessment of model accuracy in statistical learning.
- ULO2:** Explain the basics and key concepts associated with decision tree models and its ensemble methods and perform related interpretations.
- ULO3:** Explain the uses and key concepts of principal component analysis and perform related interpretations.
- ULO4:** Demonstrate an understanding of the various concepts related to clustering methods.

General Assessment Information

Late Assessment Submission Penalty (**written assessments**)

If you submit your assessment late, 5% of the total possible marks will be deducted for each day (including weekends), up to 7 days. Submissions more than 7 days late will receive a mark of 0. Example 1 (out of 100): If you score 85/100 but submit 20 hours late, you will lose 5 marks and receive 80/100. Example 2 (out of 30): If you score 27/30 but submit 20 hours late, you will lose 1.5 marks and receive 25.5/30.

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	Groupwork/Individual	Short Extension	AI Approach
Professional practice: Risk modelling	20%	No	18/09/2026	Individual	Yes	Open AI
Formal examination: Test	20%	No	Week 9	Individual	No	Observed
Formal examination	60%	No	Exam period	Individual	No	Observed

Professional practice: Risk modelling

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 10 hours

Due: **18/09/2026**

Weighting: **20%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open AI

The purpose of this assessment is for you to demonstrate problem-solving skills in R, focusing on model accuracy assessment, decision trees (including ensemble methods), principal component analysis, and clustering techniques. You will apply these concepts in R and compare their effectiveness in different scenarios.

You will complete problem-solving questions requiring detailed solutions in R.

Skills in focus:

- Critical thinking and problem solving
- Digital skills
- Communication skills
- Discipline knowledge

Deliverable(s): Written solutions (with R code)

Individual assessment

On successful completion you will be able to:

- Demonstrate an understanding of the various concepts related to the assessment of model accuracy in statistical learning.
- Explain the basics and key concepts associated with decision tree models and its ensemble methods and perform related interpretations.

Formal examination: Test

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Week 9**

Weighting: **20%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

The purpose of this assessment is for you to demonstrate your understanding of statistical learning concepts, focusing on the assessment of model accuracy, decision tree models (including ensemble methods), principal component analysis (PCA), and clustering methods.

You will participate in a test (approximately 90 minutes) held during class time to perform calculations, analyses, and interpretations related to topics learnt in the semester.

Skills in focus:

- Discipline knowledge
- Critical thinking and problem solving

Deliverable(s): Class test demonstrating responses to problem scenarios and discipline related questions.

Individual assessment

On successful completion you will be able to:

- Demonstrate an understanding of the various concepts related to the assessment of model accuracy in statistical learning.
- Explain the basics and key concepts associated with decision tree models and its ensemble methods and perform related interpretations.
- Explain the uses and key concepts of principal component analysis and perform related interpretations.

Formal examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 28 hours

Due: **Exam period**

Weighting: **60%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

The purpose of this assessment is for you to formally demonstrate the expertise you have gained in this unit.

You will participate in a 3-hour exam held during the University Examination period. Important information about the exam will be made available on the unit iLearn page. You should also review the [MQ Exams website](#) for general tips.

Deliverable(s): Formal exam.

Individual assessment

On successful completion you will be able to:

- Demonstrate an understanding of the various concepts related to the assessment of model accuracy in statistical learning.
- Explain the basics and key concepts associated with decision tree models and its ensemble methods and perform related interpretations.
- Explain the uses and key concepts of principal component analysis and perform related interpretations.

- Demonstrate an understanding of the various concepts related to clustering methods.

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
- [Academic Success](#) 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.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Please refer to iLearn for details.

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.

- [Ask a Study Coach](#)
- [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 <https://students.mq.edu.au/support/technology/service-desk>.

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 2026.03 of the [Handbook](#)