STAT6180

Statistical Data Analytics

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

School of Mathematical and Physical Sciences

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
Jun Han
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Contact via Contact via email.
12WW 634
See iLearn for consultation hours.

Credit points
10

Prerequisites

Corequisites
STAT6170

Co-badged status
STAT2170

Unit description
This unit aims to extend and broaden statistical experience from STAT6170, emphasising the practical application of data analytics to a diverse range of real-world problems. Students will acquire the skills necessary to conduct and interpret various statistical analyses and tests, including one-way and two-way analysis of variance, as well as multiple linear regression. The primary focus is on hands-on applications using the R programming language, enabling students to engage in the end-to-end data science workflow. Students will utilise R to visualise data, construct models, and validate their results, ensuring a comprehensive understanding of statistical data analysis in practical contexts.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure

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: Create specific questions tailored to the context or domain and determine the suitable statistical methods for analysis
ULO2: Create, assess and interpret numerical and visual summaries for various data types, including extensive or intricate datasets
ULO3: Integrate a software version control system, such as Git and Github, into the analysis workflow.
ULO4: Identify, justify and implement appropriate parametric or non-parametric statistical tests.
ULO5: Formulate, validate, evaluate and interpret appropriate linear models to describe the correlations among multiple factors.
ULO6: Create a reproducible report to communicate statistical insights using a literate programming tool, such as Quarto.

General Assessment Information

Attendance and participation

We strongly encourage all students to participate actively in all learning activities. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Requirements to Pass this Unit

To pass this unit, you must:

- Achieve a total mark equal to or greater than 50%.

Assessment Release

- R-based Skill Assessment: In Week 5, during the SGTA class in which you are registered.
- Case Study: Specifications to be released no later than 2nd October.

Hurdle Assessments

There is no Hurdle Assessment in this unit.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation 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. The submission time for all uploaded assessments is **11:55 pm**. A 1-hour grace period will be provided to students who experience

technical concerns. For any late submission of time-sensitive tasks, such as scheduled tests/ exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration. For example, if the assignment is worth 8 marks (of the entire unit) and your submission is late by 19 hours (or 23 hours 59 minutes 59 seconds), 0.4 marks (5% of 8 marks) will be deducted. If your submission is late by 24 hours (or 47 hours 59 minutes 59 seconds), 0.8 marks (10% of 8 marks) will be deducted, and so on.

Assessments where Late Submissions will be accepted:

- R-based Skill Assessment – YES, Standard Late Penalty applies;
- Case Study – YES, Standard Late Penalty applies;
- Final Examination – NO, unless Special Consideration is granted.

Special Considerations and Short Extensions

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable, and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through https://connect.mq.edu.au.

Short Extensions

For some assessment types, students are allowed to request an extra 3 calendar days to complete eligible assessments.

Written Assessments/Quizzes/Tests: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through https://connect.mq.edu.au.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
R-based skill assessment	25%	No	28/08/2026	Individual	No	Observed
Case Study	35%	No	16/10/2026	Individual	Yes	Open
Final Examination	40%	No	Exam Period	Individual	No	Observed

R-based skill assessment

Assessment Type [1]: Experiential task
Indicative Time on Task [2]: 11 hours
Due: **28/08/2026**
Weighting: **25%**

Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

You will demonstrate your practical data analysis skills by applying statistical techniques to an assigned dataset during an invigilated, in-class R-based practice test.

On successful completion you will be able to:

- Create specific questions tailored to the context or domain and determine the suitable statistical methods for analysis
- Create, assess and interpret numerical and visual summaries for various data types, including extensive or intricate datasets
- Integrate a software version control system, such as Git and Github, into the analysis workflow.
- Identify, justify and implement appropriate parametric or non-parametric statistical tests.

Case Study

Assessment Type [1]: Written Submission
Indicative Time on Task [2]: 20 hours
Due: **16/10/2026**
Weighting: **35%**
Groupwork/Individual: Individual
Short extension [3]: Yes
AI Approach: Open

You will conduct a case study using a real-world dataset to apply the concepts and techniques learned in this unit. You will demonstrate your analytical and communication skills by presenting your findings in a clear, reproducible report.

On successful completion you will be able to:

- Create specific questions tailored to the context or domain and determine the suitable statistical methods for analysis
- Create, assess and interpret numerical and visual summaries for various data types, including extensive or intricate datasets
- Integrate a software version control system, such as Git and Github, into the analysis workflow.
- Identify, justify and implement appropriate parametric or non-parametric statistical tests.
- Formulate, validate, evaluate and interpret appropriate linear models to describe the correlations among multiple factors.
- Create a reproducible report to communicate statistical insights using a literate

programming tool, such as Quarto.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 10 hours
Due: **Exam Period**
Weighting: **40%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

You will complete a formal invigilated examination to demonstrate your achievement of the unit's learning outcomes by recalling, applying, and evaluating key concepts.

On successful completion you will be able to:

- Create specific questions tailored to the context or domain and determine the suitable statistical methods for analysis
- Create, assess and interpret numerical and visual summaries for various data types, including extensive or intricate datasets
- Identify, justify and implement appropriate parametric or non-parametric statistical tests.
- Formulate, validate, evaluate and interpret appropriate linear models to describe the correlations among multiple factors.

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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
- 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

Classes

Lectures (beginning in Week 1): pre-recorded lecture videos will be released each week.

Workshops (beginning in Week 1): There is a one-hour workshop each week.

SGTA classes (beginning in Week 2): Students must register for and attend one two-hour class per week.

The timetable for classes can be found on the University website at: http://publish.mq.edu.au/

Enrolment can be managed using eStudent at: https://students.mq.edu.au/support/technology/systems/estudent

Suggested textbooks

The following textbook is useful as a supplementary resource for additional questions and explanations. It is available from the Macquarie University library:

- Moore, D.S., 2017. *Introduction to the Practice of Statistics*. WH Freeman and Company.

Technology Used and Required

This subject requires the use of the following computer software:

- **R**: R is a free statistical software package. Access and installation instructions may be found at: https://www.r-project.org/
- **RStudio:** RStudio is an open-source tool that is used to manage and present work performed using R. Access and installation instructions may be found at https://rstudio.com/products/rstudio/download/
- **Quarto:** An open-source scientific and technical publishing system, installed by default with the latest release of RStudio.
- **LaTeX**: LaTeX is a free mathematical typesetting program. Access and installation instructions may be found at: https://www.latex-project.org/get/

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Unit Schedule

This is a draft schedule and is subject to change.

Week	Topics	Assessment
1	Course introduction; One-sided tests; Type I and Type II error; Introduction to R/ RStudio	
2	Modified two-sample t-test; Assessing normality and equal variance assumptions	
3	One-way ANOVA	
4	One-way ANOVA, Multiple comparisons	
5	Transformations; Non-parametrics; Power and sample size	R-Based Skill Assessment Due

Week	Topics	Assessment
6	Data management; R Markdown; Simple linear regression	
Session 2 Break		
7	Simple linear regression and model validation; Multiple regression	
8	Multiple regression and model validation	
9	Extensions and examples of multiple regression	
10	Two-way ANOVA	Case Study Due
11	Two-Way ANOVA and multiple comparisons	
12	Two-Way ANOVA, regression, and multiple comparisons	
13	Exam Details and Revision	

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 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 2026.02 of the Handbook