



STAT8124

Advanced Methods in Data Visualisation

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

School of Mathematical and Physical Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor/Lecturer

Houying Zhu

houying.zhu@mq.edu.au

Contact via Email

Room 638 12 Wally's Walk

By appointment (see iLearn for details)

Unit Convenor/Lecturer

Petra Graham

petra.graham@mq.edu.au

Contact via Email

Room 338 12 Wally's Walk

By appointment (see iLearn for details)

Credit points

10

Prerequisites

STAT6191 or STAT8310 or BUSA6004 or ECON6034 or ACST8095 or (Admission to GradCertResFSE or GradDipResFSE)

Corequisites

Co-badged status

Unit description

This unit moves beyond foundational visualisation techniques to address real-world analytical challenges. You will explore questions such as: How can hidden patterns be revealed in high-dimensional data? How do effective dashboards support evidence-based decision-making? What makes a complex visualisation both clear and compelling? Central to the unit is the art of telling stories with data.

You will gain hands-on experience using R to analyse, design, and communicate advanced visualisations, as well as develop interactive dashboards using real data sets. By the end of the unit, you will be able to apply specialised tools and principled visualisation strategies to transform complex data into clear and compelling visual narratives, preparing you for advanced research and industry-level analytics in a data-rich world.

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: Design and construct advanced data visualisations using R to represent high-dimensional data effectively

ULO2: Evaluate the effectiveness and clarity of complex visualisations for diverse audiences, ensuring that they meet ethical standards and support informed decision-making

ULO3: Synthesise multivariate data analysis techniques with visualisation principles to reveal hidden patterns and relationships in complex data sets

ULO4: Communicate complex findings and data stories through compelling, evidence-based visuals and interactive dashboards tailored to stakeholder needs

General Assessment Information

General Assessment Information

Requirements to Pass this Unit

To pass this unit, you need to achieve a total mark equal to or greater than 50% across all assessments.

Hurdle Assessments: There is no Hurdle Assessment in this unit.

Release

- Assignment: To be released no later than 14th August.
- Team project: Specifications to be released no later than 14th Sep.

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 learning experience but also contributes to a vibrant, dynamic learning environment for everyone.

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

- Assessment – YES, Standard Late Penalty applies
- Team Project- YES, Standard Late Penalty applies
- Viva/oral examination- NO, unless Special Consideration is Granted

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 <http://connect.mq.edu.au/>.

Short Extensions

For some assessment types, students are allowed to request an extra 3 calendar days to complete eligible assessments. No reason or evidence is required.

Assessments where short extensions will be accepted

- Assessment – YES, Short Extension accepted

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Assessment	30%	No	28/08/2026	Individual	Yes	Open
Team Project	30%	No	16/10/2026	Group	No	Open
Viva/oral examination	40%	No	Week 13	Individual	No	Observed

Assessment

Assessment Type ¹: Written Submission

Indicative Time on Task ²: 20 hours

Due: **28/08/2026**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open

You will conduct graphical analysis of a dataset and write a report demonstrating written communication skills needed for employment in the data sciences.

On successful completion you will be able to:

- Design and construct advanced data visualisations using R to represent high-dimensional data effectively
- Evaluate the effectiveness and clarity of complex visualisations for diverse audiences, ensuring that they meet ethical standards and support informed decision-making
- Synthesise multivariate data analysis techniques with visualisation principles to reveal hidden patterns and relationships in complex data sets

Team Project

Assessment Type ¹: Portfolio

Indicative Time on Task ²: 30 hours

Due: **16/10/2026**

Weighting: **30%**

Groupwork/Individual: Group

Short extension ³: No

AI Approach: Open

In this assessment you will gain experience working as a group to identify meaningful patterns in a data set and present the findings. You will demonstrate skills in teamwork and collaboration towards a shared goal.

On successful completion you will be able to:

- Design and construct advanced data visualisations using R to represent high-dimensional data effectively
- Synthesise multivariate data analysis techniques with visualisation principles to reveal hidden patterns and relationships in complex data sets
- Communicate complex findings and data stories through compelling, evidence-based visuals and interactive dashboards tailored to stakeholder needs

Viva/oral examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 30 hours

Due: **Week 13**

Weighting: **40%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will participate in a viva/oral examination. This assessment will evaluate your ability to appraise the effectiveness and clarity of complex visualisations and to communicate complex findings through compelling data storytelling, an expectation of work-ready data professionals.

On successful completion you will be able to:

- Design and construct advanced data visualisations using R to represent high-dimensional data effectively
- Evaluate the effectiveness and clarity of complex visualisations for diverse audiences, ensuring that they meet ethical standards and support informed decision-making
- Synthesise multivariate data analysis techniques with visualisation principles to reveal hidden patterns and relationships in complex data sets
- Communicate complex findings and data stories through compelling, evidence-based visuals and interactive dashboards tailored to stakeholder needs

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): There are two one-hour lectures each week.

Small-Group Teaching Activities (SGTAs) (beginning in Week 2): Students must register for the SGTA class.

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

Software

R and RStudio: These are freely available to download from the web and will be used for data

analysis in this unit. Power BI can be accessed via Microsoft.

The following books are highly recommended reading materials.

- Wickham, H. (2016), ggplot2: Elegant Graphics for Data Analysis. Springer International Publishing.
- Wickham, H. and Grolemund, G. (2017), R for Data Science Import, Tidy, Transform, Visualize, and Model Data. O'Reilly Media, Inc, USA.
- Keen, K. J. (2010), Graphics for statistics and data analysis with R. Chapman and Hall/CRC.
- Rahlf, T. (2017), Data Visualisation with R. Springer International Publishing AG.
- Sievert, C. (2020), Interactive Web-Based Data Visualization with R, plotly, and Shiny, Chapman and Hall/CRC.
- Microsoft Learn: Power BI (official learning paths) <https://learn.microsoft.com/power-bi/>.

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

The following topics will be covered in this unit.

- Topic 1: Introduction to data visualisation and principles of statistical graphics
- Topic 2: Visualising univariate and bivariate data
- Topic 3: Visualising multivariate data
- Topic 4: Spatial data visualisation and mapping
- Topic 5: Time-dependent data visualisation
- Topic 6: Interactive data visualisation
- Topic 7: Dashboard fundamentals with Power BI
- Topic 8: Dashboard design and user experience in Power BI
- Topic 9: Advanced dashboards and deployment with Power BI
- Topic 10: Narrative design and communicating with data
- Topic 11: Data storytelling through real-world case studies
- Topic 12: Best practices, ethics, and emerging trends in data visualisation

Policies and Procedures

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

[s.mq.edu.au](https://students.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 <https://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.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

This unit has been redesigned to incorporate student feedback and better align learning activities, assessments, and weekly content with the unit's learning outcomes. This will be the first offering of the revised unit, and an oral exam has been introduced to support the development and demonstration of students' applied understanding and communication skills. We will continue to review student experience data and feedback during and after the session,

and we will keep refining the unit to strengthen the level of support provided and further enhance student engagement.

Unit information based on version 2026.01 of the [Handbook](#)