



FOSE1025

Scientific Computing

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

Science and Engineering Faculty level units

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Disclaimer

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General Information

Unit convenor and teaching staff
Unit Convenor
Connor Smith
connor.smith@mq.edu.au
Contact via email
12WW 617
See iLearn for consultation hours

Credit points
10

Prerequisites

Corequisites

Co-badged status
FOSX1025

Unit description

This unit introduces essential concepts and techniques of computing for conducting science, with special emphasis on the preparation and manipulation of data. We discuss the role of computers and computing tools in science and focus on the use of spreadsheets and other data manipulation tools.

This unit is specifically designed for students undertaking majors in Biology, Biotechnology, Chemistry, Human Biology, Earth and Environmental Sciences, and Physiological Sciences.

Students enrolling in Astronomy, Physics, Mathematics or Statistical Data Science majors **must** enrol in FOSE1030, **NOT** FOSE1025.

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: Demonstrate foundational knowledge of the role of data, computing and computing tools for science.

ULO2: Determine the appropriate computing tool to manipulate, summarise, and visualise data.

ULO3: Prepare and clean data so that it can be used to address questions in science and industry.

ULO4: Apply computer scripting languages to the preparation and processing of data to enhance reproducibility in science.

ULO5: Explain the ethical implications of the use of computers for gathering, processing, and storing data.

ULO6: Interrogate data to address a topic of current interest to science and society.

General Assessment Information

To pass this unit, you must:

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

There are no hurdle assessments for this unit.

We strongly encourage all students to actively participate 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.

Release:

- Assessment 3: Reproducibility Project to be released no later than the 16th of October, 2026.

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.

1. Diagnostic Test – NO, unless Special Consideration is granted
2. Data Preparation and Manipulation – NO, unless Special Consideration is granted
3. Reproducibility Project – YES, Standard Late Penalty applies

Special Considerations:

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>.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Diagnostic Test	15%	No	Week 4, during your registered SGTA class.	Individual	No	Observed
Data Preparation and Manipulation	35%	No	Week 7, during your registered SGTA class.	Individual	No	Observed
Reproducibility Project	50%	No	06/11/2026	Individual	Yes	Open

Diagnostic Test

Assessment Type ¹: Examination

Indicative Time on Task ²: 10 hours

Due: **Week 4, during your registered SGTA class.**

Weighting: **15%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

Scientific computing relies on strong foundational knowledge of data, computation, and tools used in professional practice. You will complete a diagnostic test that checks your understanding of core concepts in scientific computing and how data and tools support problem solving. This task helps you identify strengths and gaps and builds readiness for later computational analysis.

On successful completion you will be able to:

- Demonstrate foundational knowledge of the role of data, computing and computing tools for science.
- Determine the appropriate computing tool to manipulate, summarise, and visualise data.

Data Preparation and Manipulation

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 35 hours

Due: **Week 7, during your registered SGTA class.**

Weighting: **35%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

Data preparation and manipulation are essential workplace skills for producing reliable insights and supporting evidence-based decisions. You will clean, prepare, manipulate and visualise a dataset in Excel during an in-class, supervised task. This assessment develops practical data handling, tool proficiency, and quality-checking skills for applied analysis.

On successful completion you will be able to:

- Determine the appropriate computing tool to manipulate, summarise, and visualise data.
- Prepare and clean data so that it can be used to address questions in science and industry.
- Interrogate data to address a topic of current interest to science and society.

Reproducibility Project

Assessment Type ¹: Portfolio

Indicative Time on Task ²: 40 hours

Due: **06/11/2026**

Weighting: **50%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open

Reproducible analysis is a core expectation in scientific and industry practice, ensuring results can be verified, reused, and trusted. You will clean, process, and analyse data in R to address a scientific question and compile a portfolio with a reproducible script, a written report, and an oral or recorded explanation of your workflow. This assessment develops reproducible coding, transparent documentation, and evidence-based communication skills.

On successful completion you will be able to:

- Apply computer scripting languages to the preparation and processing of data to enhance reproducibility in science.

- Explain the ethical implications of the use of computers for gathering, processing, and storing data.
 - Interrogate data to address a topic of current interest to science and society.
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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

Students should enrol in and attend the following classes each week:

- 1 x 120-minute lecture beginning in **Week 1**
- 1 x 120-minute SGTA beginning in **Week 2**

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

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

Method of Communication

We will communicate with you via your university email or through announcements on iLearn. Instructions for seeking assistance can be located on the FOSE1025 iLearn page in a dedicated section.

Recommended Textbooks

This unit does not require a textbook. Each week, review the assigned supporting materials, which will be accessible through iLearn.

Technology Used and Required

All unit material is delivered through iLearn. The link may be found at <http://ilearn.mq.edu.au>.

This unit will use the following software:

- Microsoft Excel
- R and RStudio

Unit Schedule

Week	Lecture Topic
1	Computing in Science
2	Basic Concepts in Computing
3	Data Cleaning and Manipulation in Excel
4	Data Analysis and Formulas in Excel
5	Data Visualisation in Excel
6	Introduction to R and RStudio
7	Basics of R and RStudio
8	Data Preparation in R
9	Data Processing in R
10	Data Presentation in R
11	Ethics and AI use
12	Presenting and Reporting
13	Revision week

The topics listed above cover all material addressed in this unit. The order in which this information is presented in lectures may not match the above list.

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 \(https://students.mq.edu.au/su\)](https://students.mq.edu.au/su)

[upport/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.

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.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. As such, no change to the delivery of the unit is planned, however we will continue to strive to improve the level of support and the level of student engagement.

Unit information based on version 2026.04 of the [Handbook](#)