



# NSCI7915

## Reproducible Scientific Analysis

Session 1, Online-scheduled-weekday 2023

*School of Natural Sciences*

### Contents

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<a href="#"><u>General Information</u></a>	2
<a href="#"><u>Learning Outcomes</u></a>	2
<a href="#"><u>General Assessment Information</u></a>	3
<a href="#"><u>Assessment Tasks</u></a>	4
<a href="#"><u>Delivery and Resources</u></a>	6
<a href="#"><u>Policies and Procedures</u></a>	8

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Drew Allen

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Credit points

10

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Unit description

This foundation unit has been developed specifically for BPhil/MRes students to provide them with a solid foundation in the philosophy and practice of reproducible scientific analysis. Through a series of tutorials and workshops, students will incrementally build their skills and knowledge of research in the natural sciences. In parallel, students will undertake a small research project through which they apply the very skills they are discussing in tutorial classes. The unit will provide students with experience in formulating hypotheses, designing experiments, compiling and analysing data, and communication of results. The unit provides a recap of statistical analysis and works specifically to provide a strong foundation in ethical research practices.

## 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:** Formulate testable scientific hypotheses based on a critical evaluation of the scientific literature

**ULO2:** Collate, maintain and store scientific data after assessing those data for completeness, adequacy, and quality

**ULO3:** Implement computer coding strategies to aid in the preparation, analysis, graphical visualisation, and interpretation of scientific data

**ULO4:** Prepare and present scientific research findings to a professional standard in written, graphical, and oral form

**ULO5:** Design and conduct a scientific research project in a reproducible and ethical manner

## General Assessment Information

### Requirements to Pass this Unit

To pass this unit you must:

- Attempt all assessments, and
- Achieve a total mark equal to or greater than 50%

### Late Submissions

Late submissions will be permitted for all assessment tasks in this unit. A consistent penalty will be applied for late submissions as follows:

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 7<sup>th</sup> day (including weekends). After the 7<sup>th</sup> 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 a technical concern.

### 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 [ask.mq.edu.au](https://ask.mq.edu.au).

### COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: <https://www.mq.edu.au/about/coronavirus-faqs>. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Project pre-registration</a>	15%	No	Week 5
<a href="#">Preliminary analyses</a>	15%	No	Week 9
<a href="#">Project presentation</a>	15%	No	Week 13
<a href="#">Project Report</a>	50%	No	Week 13
<a href="#">Time on task reflection</a>	5%	No	Week 13

### Project pre-registration

Assessment Type <sup>1</sup>: Plan

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Week 5**

Weighting: **15%**

You will complete a preregistration of your research project and will upload your data and metadata to an online repository. The preregistration will outline the background, aims and methods of your project, and how you will use data to achieve these aims. You should use the feedback received on your pre-registration to improve your project.

On successful completion you will be able to:

- Formulate testable scientific hypotheses based on a critical evaluation of the scientific literature
- Prepare and present scientific research findings to a professional standard in written, graphical, and oral form
- Design and conduct a scientific research project in a reproducible and ethical manner

### Preliminary analyses

Assessment Type <sup>1</sup>: Programming Task

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Week 9**

Weighting: **15%**

You will complete preliminary analyses for your research project. This provides an opportunity to

get feedback prior to completing your research project, final project report and presentation.

On successful completion you will be able to:

- Formulate testable scientific hypotheses based on a critical evaluation of the scientific literature
- Collate, maintain and store scientific data after assessing those data for completeness, adequacy, and quality
- Implement computer coding strategies to aid in the preparation, analysis, graphical visualisation, and interpretation of scientific data
- Prepare and present scientific research findings to a professional standard in written, graphical, and oral form
- Design and conduct a scientific research project in a reproducible and ethical manner

## Project presentation

Assessment Type <sup>1</sup>: Presentation

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Week 13**

Weighting: **15%**

You will give an oral presentation to your peers on the results of your research project.

On successful completion you will be able to:

- Prepare and present scientific research findings to a professional standard in written, graphical, and oral form
- Design and conduct a scientific research project in a reproducible and ethical manner

## Project Report

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 28 hours

Due: **Week 13**

Weighting: **50%**

You will write up the results of your research project in the form of a scientific paper.

On successful completion you will be able to:

- Formulate testable scientific hypotheses based on a critical evaluation of the scientific literature
- Collate, maintain and store scientific data after assessing those data for completeness, adequacy, and quality
- Implement computer coding strategies to aid in the preparation, analysis, graphical visualisation, and interpretation of scientific data
- Prepare and present scientific research findings to a professional standard in written, graphical, and oral form
- Design and conduct a scientific research project in a reproducible and ethical manner

## Time on task reflection

Assessment Type <sup>1</sup>: Reflective Writing

Indicative Time on Task <sup>2</sup>: 7 hours

Due: **Week 13**

Weighting: **5%**

Through the session, you will keep a time on task diary. At the end of the session, you will reflect on the time required to perform various tasks, your time management, and identify ways to improve your time management, research planning, and ways to be more efficient in your work.

On successful completion you will be able to:

- Design and conduct a scientific research project in a reproducible and ethical manner

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<sup>1</sup> 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.

<sup>2</sup> 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

**TO PASS THIS UNIT YOU MUST:**

Achieve a total mark of at least 50%.

**THIS UNIT REQUIRES THAT YOU HAVE ACCESS TO A LAPTOP COMPUTER.** To undertake the assessments in this unit, and participate in workshops and practicals, you will need to install a variety of software packages on your computer, including R Studio and LaTeX. If you require assistance with software installation, you can contact the convenor to schedule an appointment.

### **Workshops**

Weeks 1 and 2 will be comprised on two 8-hour workshops. You can participate in these workshops either in person or online over Zoom. You are strongly encouraged to attend in person if you are able to do so. Recordings of workshops will also be made available on iLearn. You will need to bring your laptop to these workshops.

### **Practicals**

Practicals will last 2 hours and will be conducted on campus and online via Zoom. Recordings of practicals will also be made available on iLearn. Most weeks, you will need to bring your laptop.

### **Communication**

The primary means of communication for this unit is via iLearn, which can be accessed by most web browsers from inside or outside the University. We expect you to use iLearn for:

- Regularly checking announcements
- Discussing the unit and its content with staff and other students
- Downloading workshop and practical materials
- Downloading reference materials

The iLearn login page is <https://ilearn.mq.edu.au/>. Your username is your student number. Please contact Student IT Help if you experience any technical problems.

### **Missed Workshops and Practical**

Workshops and practicals will be recorded, but attendance is highly recommended.

### **Overall grades**

The University grading is: fail (F <50%), pass (P 50%-64%), credit (CR 65%-74%), distinction (D 75%-84%) and high distinction (HD 85%-100%).

### **Assignment submission, Turnitin and Plagiarism**

This is a paperless unit so written assessments will be submitted through iLearn via a Turnitin link. Your written assignment will be checked for plagiarism using Turnitin. Plagiarism will not be tolerated. Do not under any circumstances lend your work to another student. If that student plagiarises your work, you too may be liable. The penalties imposed by the University for plagiarism are serious and may include expulsion from the University. A full outline of the Universities policy on plagiarism is found at [http://www.mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://www.mq.edu.au/policy/docs/academic_honesty/policy.html).

## Support

Finding answers to questions:

1. Consult materials posted on iLearn.
2. Review posted answers to questions on the iLearn forum - often your question has already been asked and answered by another student.
3. If the answer to a question will benefit others, please post it on iLearn.
4. Also feel free to email the convenor directly ([drew.allen@mq.edu.au](mailto:drew.allen@mq.edu.au)) if you have questions or would like to schedule an appointment.

## Textbooks

There are no required textbooks for the unit, but a variety of resources will be posted on iLearn.

## 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 [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/>

## The Writing Centre

[The Writing Centre](#) 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 [AskMQ](#), 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/](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.