



STAT1378

Coding and Communication in Statistics

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Mathematical and Physical Sciences

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General Information

Unit convenor and teaching staff

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Convenor

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Credit points

10

Prerequisites

STAT1371 or STAT171 or STAT1170 or STAT170 or FOSE1015 or FOSX1015 or STAT1250

Corequisites

Co-badged status

Unit description

Professional statistical work is often a mixture of statistical modelling, programming and results' communication. This unit addresses the methods and the tools required to perform this job introducing students to state-of-the-art programming languages used to solve Statistical problems and communicate Statistical results. The unit is very practical, with classes and assessment mostly held in a computer lab. Students who have completed this unit will be able to use appropriate software tools to solve complex statistical problems and to effectively communicate their results.

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: Express mathematical and statistical objects in terms of computational code and data structures.

ULO2: Analyse mathematical and statistical problems and identify language-agnostic computational strategies for solving them.

ULO3: Implement computational strategies in a high-level programming language to solve mathematical and statistical problems.

ULO4: Evaluate and solve specific mathematical and statistical challenges by identifying and utilising the existing tools offered by high-level programming languages.

ULO5: Communicate effectively and in a range of contexts mathematical and statistical ideas and results, using appropriate software tools.

ULO6: Demonstrate foundational learning skills including active engagement in their learning process.

General Assessment Information

Requirements to Pass this Unit

To pass this unit you must:

- Achieve a total mark equal to or greater than 50%, and
- Participate in, and undertake all the Practice-based activities for a minimum of 10 of the 12 weekly SGTAs.

Hurdle Assessments

Most of our hurdle assessments are linked to our teaching activities.

Assessment 1: Practice-based skills for SGTA classes (0%)

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of statistical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs. This is a hurdle assessment meaning that failure to meet this requirement may result in a **fail** grade for the unit. Students are permitted up to two absences: **additional absences will require a Special Consideration to be applied for** (see below).

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written 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. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission 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.

Assessments where Late Submissions will be accepted.

- Participation to SGTA classes – NO, unless Special Consideration is granted;
- Problem Set 1 – YES, Standard Late Penalty applies;
- Problem Set 2 – YES, Standard Late Penalty applies;
- Project – YES, Standard Late Penalty applies;
- Presentation – YES, Standard Late Penalty applies.

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.

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 ask.mq.edu.au.

Weekly practice-based tasks for SGTA classes: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 12 of the weekly SGTA classes. If you miss a weekly SGTA class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week.

If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time.

Note that a Special Consideration should **only be applied** for if you miss more than two of the weekly SGTA classes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Practice Based Skills for SGTA classes	0%	Yes	Weekly
Problem Set 1	20%	No	Week 5
Problem Set 2	25%	No	Week 10
Project	35%	No	Week 13

Name	Weighting	Hurdle	Due
Presentation	20%	No	Week 13

Practice Based Skills for SGTA classes

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Weekly**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of statistical & computational techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs.

On successful completion you will be able to:

- Demonstrate foundational learning skills including active engagement in their learning process.

Problem Set 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 10 hours

Due: **Week 5**

Weighting: **20%**

These problems will test the ability of students to use statistical software to analyse provided problems, and express the results using mathematical typesetting.

On successful completion you will be able to:

- Express mathematical and statistical objects in terms of computational code and data structures.
- Analyse mathematical and statistical problems and identify language-agnostic computational strategies for solving them.
- Implement computational strategies in a high-level programming language to solve

mathematical and statistical problems.

- Evaluate and solve specific mathematical and statistical challenges by identifying and utilising the existing tools offered by high-level programming languages.
- Communicate effectively and in a range of contexts mathematical and statistical ideas and results, using appropriate software tools.

Problem Set 2

Assessment Type ¹: Problem set

Indicative Time on Task ²: 10 hours

Due: **Week 10**

Weighting: **25%**

These problems will test the ability of students to use statistical software to analyse provided problems, and express the results using mathematical typesetting.

On successful completion you will be able to:

- Express mathematical and statistical objects in terms of computational code and data structures.
- Analyse mathematical and statistical problems and identify language-agnostic computational strategies for solving them.
- Implement computational strategies in a high-level programming language to solve mathematical and statistical problems.
- Evaluate and solve specific mathematical and statistical challenges by identifying and utilising the existing tools offered by high-level programming languages.
- Communicate effectively and in a range of contexts mathematical and statistical ideas and results, using appropriate software tools.

Project

Assessment Type ¹: Project

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **35%**

The students will be assigned a mathematical problem. They will be required to study this problem using appropriate computational techniques implemented in mathematical software. The students will be required to produce a written report and typeset it appropriately.

On successful completion you will be able to:

- Express mathematical and statistical objects in terms of computational code and data structures.
- Analyse mathematical and statistical problems and identify language-agnostic computational strategies for solving them.
- Implement computational strategies in a high-level programming language to solve mathematical and statistical problems.
- Evaluate and solve specific mathematical and statistical challenges by identifying and utilising the existing tools offered by high-level programming languages.
- Communicate effectively and in a range of contexts mathematical and statistical ideas and results, using appropriate software tools.

Presentation

Assessment Type ¹: Presentation

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **20%**

The students will be asked to present the solution to a statistical problem in a specific format.

On successful completion you will be able to:

- Express mathematical and statistical objects in terms of computational code and data structures.
- Analyse mathematical and statistical problems and identify language-agnostic computational strategies for solving them.
- Implement computational strategies in a high-level programming language to solve mathematical and statistical problems.
- Evaluate and solve specific mathematical and statistical challenges by identifying and utilising the existing tools offered by high-level programming languages.
- Communicate effectively and in a range of contexts mathematical and statistical ideas and results, using appropriate software tools.

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
- the [Writing Centre](#) 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

Delivery and Resources

Classes

Lectures (beginning in Week 1): There are no formal lectures scheduled for this unit. Each week we will have some video recordings covering the course material.

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

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>

Suggested textbooks

The following textbooks are useful as supplementary resources, for additional questions and explanations. They are available from the Macquarie University library:

- Garrett Golemund, Hadley Wickham & Mine Çetinkaya-Rundel (2023) R for Data Science, 2nd Edition. O'Reilly Media, Inc.
- Golemund, G. (2014) Hands-on programming with R. 1st edition. Sebastopol, CA, O'Reilly Media.
- Wickham, H. (2016) ggplot2 Elegant Graphics for Data Analysis . 2nd ed. 2016. Cham, Springer International Publishing. doi:10.1007/978-3-319-24277-4.
- Wickham, H. (2015) R packages . First edition. Sebastopol, CA, O'Reilly.

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/>
- **LaTeX**: LaTeX is a free mathematical typesetting program. Access and installation instructions may be found at: <https://www.latex-project.org/get/>

Students are invited to bring their own devices (BYOD) and a laptop is recommended. Acceptable platforms are Windows, Linux and Mac.

Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion forum or sent to your lecturers from your university email address.

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.

Unit Schedule

This is a draft schedule and is subjected to change.

Week	Topics	Assessment
1	The Basics	
2	Flow Control	
3	Introduction to Tidyverse and ggplot2	
4	Introduction to Iteration	
5	Writing R Packages	Problem Set 1 due
6	Version Control with git and Github	
7	Introduction to R Markdown	
8	Introduction to LaTeX	
Session 2 Break		
9	Introduction to LaTeX Part II	
10	Reproducible Report	Problem Set 2 due
11	Markdown Presentation	
12	Introduction to Quarto	
13	No Lecture	Project due Presentation due

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/>

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 the [Service Connect Portal](#), 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/.

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.

Changes since First Published

Date	Description
09/07/2024	Updated the timetable URL.

Unit information based on version 2024.02 of the [Handbook](#)