



STAT1378

Coding and Communication in Statistics

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Mathematical and Physical Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor & Lecturer

Thomas Fung

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Contact via Email

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See iLearn

Credit points

10

Prerequisites

STAT1371 or STAT171 or STAT1170 or STAT170 or FOSE1015 or FOSX1015

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

HURDLES: Attendance at, and reasonable engagement in, Small Group Teaching Activities (SGTA) in this unit is **compulsory**. Attendance and reasonable engagement in the class activities in at least 10 out of 12 of the classes are requirements to pass the unit. This is a hurdle requirement.

ASSIGNMENT SUBMISSION: Assignment submission will be online through the iLearn page.

Submit assignments online via the appropriate assignment link on the iLearn page. A personalised cover sheet is not required with online submissions. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

- Assignment submission is via iLearn.
- Please note the quick guide on how to upload your assignments provided on the iLearn page.
- If there are technical obstructions to your submission online, please email us to let us know.

You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make frequent submissions of your partially completed work as insurance against technical or other problems near the submission deadline.

LATE SUBMISSION:

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 around the original due date, i.e. on-time submission. Late submissions that are more than an hour late to the original due date do not receive a 1-hour grace period.

Assessments where Late Submissions will be accepted.

In this unit late submissions will be accepted as follows:

- 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.

FINAL EXAM POLICY: There is no final exam for this unit.

Assessment Tasks

Name	Weighting	Hurdle	Due
Participation to SGTA classes	0%	Yes	Weekly
Problem Set 1	20%	No	Week 5
Problem Set 2	25%	No	Week 10
Project	35%	No	Week 13
Presentation	20%	No	Week 13

Participation to SGTA classes

Assessment Type ¹: Participatory 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)

Students must attend and participate in at least 10 of the weekly SGTA classes to pass this unit.

This is a hurdle requirement.

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

Lectures and Small Group Teaching Activities:

There are no formal lectures scheduled for this unit. Each week we will have some video recordings covering the course material.

Each week will have one two-hour SGTA.

The unit material consists of notes and videos that will be distributed on iLearn.

Required Materials:

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). Acceptable platforms are Windows, Linux and Mac. For students choosing to participate in face-to-face activities, a laptop is recommended. If students do not have a suitable machine, they are invited to contact the teaching staff as soon as possible.

Unit Schedule

This is a draft schedule and is subjected to change.

Week	Topics	
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 RMarkdown	
	Session 2 Break	
8	Introduction to LaTeX Parts I & II	
9	Reproducible Report	
10	Markdown Presentation: the Basic	Problem Set 2 due
11	Markdown Presentation with xaringan	
12	TBD	
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 ask.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 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/.

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.