



# STAT2170

## Applied Statistics

Session 2, In person-scheduled-weekday, North Ryde 2023

*School of Mathematical and Physical Sciences*

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## General Information

### Unit convenor and teaching staff

Convenor

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Convenor

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### Credit points

10

### Prerequisites

FOSE1015 or STAT170(P) or STAT1170 or STAT171 or STAT1371 or STAT150 or STAT1250

### Corequisites

### Co-badged status

STAT6180

### Unit description

This unit aims to extend and broaden statistical experience from 1000-level statistics units, with a focus on application to real-world analysis. It covers relationships between categorical or continuous explanatory variables and a continuous response variable using the techniques of one-way and two-way analysis of variance and simple and multiple linear regression. Data management, report writing, graphical presentation of results, and power analysis are discussed.

## 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:** Summarise data graphically and numerically and interpret them.

**ULO2:** Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.

**ULO3:** Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.

**ULO4:** Use statistical software to create model output and interpret them.

**ULO5:** Demonstrate foundational learning skills including active engagement in their learning process.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Practice Based Skills</a>	0%	Yes	Weekly
<a href="#">iLearn Quiz</a>	20%	No	Week 4
<a href="#">Mid-Semester Test</a>	25%	No	Week 7
<a href="#">Assignment</a>	25%	No	Week 11
<a href="#">Final Exam</a>	30%	No	Formal Examination Period

### Practice Based Skills

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 6 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.

## iLearn Quiz

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 1 hours

Due: **Week 4**

Weighting: **20%**

The quiz will become available on iLearn.

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

## Mid-Semester Test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 1 hours

Due: **Week 7**

Weighting: **25%**

Mid-Semester Test

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

## Assignment

Assessment Type <sup>1</sup>: Quantitative analysis task

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

Due: **Week 11**

Weighting: **25%**

The assignment will cover all learning outcomes.

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.
- Demonstrate foundational learning skills including active engagement in their learning process.

## Final Exam

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

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

Due: **Formal Examination Period**

Weighting: **30%**

Formal invigilated examination testing the learning outcomes of the unit.

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

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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

### Classes

Lectures (beginning in Week 1): There is one two-hour lectures each week.

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://timetables.mq.edu.au/>

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

### Suggested textbooks

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

- Moore, D.S., 2017. *Introduction to the Practice of Statistics*. WH Freeman and company.

### 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/>

### 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	Assignment
1	Course introduction; One-sided tests; Type I and Type II error; Introduction to R/RStudio	
2	Modified two-sample t-test; Assessing normality and equal variance assumptions	
3	One way ANOVA	
4	One way ANOVA, Multiple comparisons	iLearn Quizzes Due
5	Transformations; Non-parametrics; Power and Sample Size	
6	Data management; R Markdown; Simple linear regression	
7	Simple linear regression and model validation; Multiple regression	Mid-Semester Test Due
Session 2 Break		
8	Multiple regression and model validation	
9	Extensions and examples of multiple regression	
10	Two-way ANOVA	
11	Two-Way ANOVA and Multiple Comparisons	Assignment Due
12	Two-Way ANOVA, Regression and Multiple Comparisons	
13	Exam Details and Revision	

## 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.

## 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.

Based on valuable student feedback gathered through student representatives and surveys, we have taken proactive steps to enhance the student learning experience. In response to concerns about bloated lecture materials, we have made targeted revisions to streamline the content, ensuring a more focused and efficient approach to course delivery. These revisions include the removal of redundant or repetitive examples, allowing for a more concise and impactful learning journey for our students. By carefully considering the feedback received, we aim to create an optimised learning environment that maximizes student engagement and facilitates a deeper understanding of the subject matter.

## 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;
- iLearn Quiz – NO, unless Special Consideration is granted;
- Mid-Semester Test – NO, unless Special Consideration is granted;
- Assignment – YES, Standard Late Penalty applies;
- Final Exam – NO, unless Special Consideration is granted.

## 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.

## 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](https://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.