



# STAT2371

## Statistics

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

*School of Mathematical and Physical Sciences*

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### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Lead Unit Convenor/Lecturer

Georgy Sofronov

[georgy.sofronov@mq.edu.au](mailto:georgy.sofronov@mq.edu.au)

Contact via Email

please refer to iLearn

Second Unit Convenor/Lecturer

Connor Smith

[connor.smith@mq.edu.au](mailto:connor.smith@mq.edu.au)

Contact via Email

please refer to iLearn

Credit points

10

Prerequisites

STAT272 or STAT2372

Corequisites

Co-badged status

Unit description

This unit introduces the foundation concepts of statistics. The unit begins with a discussion of the aims of data analysis and the objectives of principal component analysis. A discussion of random samples and their use in drawing inferences about a population is then provided. The principles of statistical inference are developed with a particular focus on point estimators, confidence intervals and hypothesis testing.

## 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 using appropriate statistical analysis, descriptive statistics and graphical presentation.

**ULO2:** Evaluate the appropriateness of a variety of statistical models/methods for various types of data, apply them, and interpret the results.

**ULO3:** Apply concepts related to statistical inference including point estimators, confidence intervals and hypothesis testing.

## General Assessment Information

To pass this unit you must achieve a total mark equal to or greater than 50%.

The test and exam must be undertaken at the time indicated in the unit guide or on iLearn. Should these activities be missed due to illness or misadventure, students may apply for special consideration.

**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. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments provided on the iLearn page.
- Please make sure that each page in your uploaded assignment corresponds to only one A4 page (do not upload an A3 page worth of content as an A4 page in landscape). If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free.
- It is your responsibility to make sure your assignment submission is legible.
- If there are technical obstructions to your submitting online, please email us to let us know.

You may submit as often as required prior to the due date/time. The assignment must be submitted by 11:55pm on its due date. 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 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 and exams, students

need to submit an application for [Special Consideration](#).

In this unit, late submissions will be accepted as follows:

- Assignment 1 - YES, Standard Late Penalty applies
- Test - NO, unless Special Consideration is granted
- Assignment 2 - YES, Standard Late Penalty applies
- Final Examination - NO, unless Special Consideration is granted

**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](http://ask.mq.edu.au).

**FINAL EXAM POLICY:** It is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only excuse for not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances, you may apply for special consideration via [ask.mq.edu.au](http://ask.mq.edu.au).

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during this supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Assignment 1</a>	10%	No	Week 5
<a href="#">Test</a>	20%	No	Week 8
<a href="#">Assignment 2</a>	10%	No	Week 11
<a href="#">Final Examination</a>	60%	No	University examination period

### Assignment 1

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

Indicative Time on Task <sup>2</sup>: 8 hours

Due: **Week 5**

Weighting: **10%**

## Assignment

On successful completion you will be able to:

- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation.
- Evaluate the appropriateness of a variety of statistical models/methods for various types of data, apply them, and interpret the results.
- Apply concepts related to statistical inference including point estimators, confidence intervals and hypothesis testing.

## Test

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

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

Due: **Week 8**

Weighting: **20%**

## Mid-Semester Test

On successful completion you will be able to:

- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation.
- Evaluate the appropriateness of a variety of statistical models/methods for various types of data, apply them, and interpret the results.
- Apply concepts related to statistical inference including point estimators, confidence intervals and hypothesis testing.

## Assignment 2

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

Indicative Time on Task <sup>2</sup>: 8 hours

Due: **Week 11**

Weighting: **10%**

## Assignment

On successful completion you will be able to:

- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation.
- Evaluate the appropriateness of a variety of statistical models/methods for various types of data, apply them, and interpret the results.
- Apply concepts related to statistical inference including point estimators, confidence intervals and hypothesis testing.

## Final Examination

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

Indicative Time on Task <sup>2</sup>: 3 hours

Due: **University examination period**

Weighting: **60%**

Formal invigilated examination testing the learning outcomes of the unit.

On successful completion you will be able to:

- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation.
- Evaluate the appropriateness of a variety of statistical models/methods for various types of data, apply them, and interpret the results.
- Apply concepts related to statistical inference including point estimators, confidence intervals and hypothesis testing.

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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

### Delivery

The unit is delivered by lectures (2 hours per week, starting in Week 1) and SGTAs (1 hour per week, starting in Week 2). All teaching material will be available on iLearn.

SGTA Exercises will be available from iLearn prior to the SGTA. Students are expected to have attempted these prior to the SGTA. Solutions will be explained, with emphasis on any area students had trouble with. At the end of the week, these solutions will then be placed on iLearn.

The supported statistical software for this unit is R/RStudio. Students need to practice how to use the software and be expected to conduct their analyses using R/RStudio for the assignments. Students should also note that the test and the final examination may involve data analysis that contains inline R codes and output that students need to interpret to answer the questions.

### Required and Recommended Texts and/or Materials

Recommended: Mendenhall W, Wackerly D and Scheaffer R. "Mathematical Statistics with Applications", Seventh Edition QA276 .M426 2008. The Library also holds copies of the sixth and previous editions as well as the Student solutions manual. The following books are useful references for this unit:

Authors	Title	Library Call No.
Bain, L.J. & Engelhardt, M.	Introduction to Probability and Mathematical Statistics	QA273.B2546/1992
Casella, G. & Berger, R.L.	Statistical Inference	QA276.C37/2002
Conover, W.J.	Practical Nonparametric Statistics	QA278.8.C65/1999
Hogg, R.V. & Craig, A.T.	Introduction to Mathematical Statistics	QA276.H59/1995
Larson, H.J.	Introduction to Probability Theory and Statistical Inference	QA273.L352/1982
Walpole, R.E. & Myers, R.H.	Probability and Statistics for Engineers and Scientists	TA340.W35/1993

### Methods of Communication

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

### Unit Schedule

TOPIC	MATERIAL COVERED
1	Introduction. Statistical terms and notations.
2	Random sampling and sampling distributions.

TOPIC	MATERIAL COVERED
3	Estimation and estimators. Point estimation methods, including the method of moments and maximum likelihood. Properties of estimators. Asymptotic (large sample) properties.
4	Confidence intervals.
5	Hypothesis testing and goodness of fit.
6	One-way analysis of variance (ANOVA) and multiple comparisons.
7	Transformations, non-parametric tests, power and data management.
8	Two-way ANOVA and multiple regression.
9	Exploratory data analysis.
10	Data analysis.

## 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.