



# STAT2371

## Statistics

Session 2, Special circumstances 2021

*Department of Mathematics and Statistics*

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### **Disclaimer**

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### **Session 2 Learning and Teaching Update**

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

## General Information

Unit convenor and teaching staff

Lead Convenor/Lecturer

Georgy Sofronov

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Contact via Email

please refer to iLearn

Second Convenor/Lecturer

Houying Zhu

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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://students.mq.edu.au/important-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

**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. 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 OF WORK:** All assessment tasks must be submitted by the official due date and time. In the case of a late submission for a non-timed assessment (e.g. an assignment), if special consideration has NOT been granted, 20% of the earned mark will be deducted for each 24-hour period (or part thereof) that the submission is late for the first 2 days (including weekends and/or public holidays). For example, if an assignment is submitted 25 hours late, its mark will attract a penalty equal to 40% of the earned mark. After 2 days (including weekends and public holidays) a mark of 0% will be awarded. Timed assessment tasks (e.g. tests, examinations) do not fall under these rules.

**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](https://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 [Learning Skills Unit](#) 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   |

## Unit Schedule

| TOPIC | MATERIAL COVERED   |
|-------|--|
| 1     | Introduction. Statistical terms and notations.   |
| 2     | Random sampling and sampling distributions.  |
| 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management 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)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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 Enquiry Service

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Equity Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## 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.