



# STAT6180

## Applied Statistics

Session 2, Online with attendance for exam, Exam centre within Australia 2021

*Archive (Pre-2022) - 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

Convenor/Lecturer

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### Credit points

10

### Prerequisites

Admission to MAppStat or GradCertAppStat or GradDipAppStat or MSc or MDataSc or MLabQAMgt or GradDipLabQAMgt or GradCertLabQAMgt or MSInnovationStat

### Corequisites

STAT6170 or STAT670

### Co-badged status

### Unit description

*This unit has an online offering for S2 which is **synchronous**, meaning there will be set times to attend online lectures and tutorials.*

This unit aims to extend and broaden statistical experience from STAT6170, 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 described.

## 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:** Understand and evaluate the assumptions underlying the models, and modify the analysis if needed.

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

## General Assessment Information

**ATTENDANCE and PARTICIPATION:** We encourage you to participate in online classes. Please contact the unit convenor as soon as possible if you have difficulty attending and participating in any classes.

**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](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.

You can check the supplementary exam information page on FSE101 in iLearn ([bit.ly/FSESupp](http://bit.ly/FSESupp)) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">iLearn Quiz</a>	10%	No	Week 4
<a href="#">Mid-Semester Test</a>	20%	No	Week 7
<a href="#">Assignment</a>	20%	No	Week 11
<a href="#">Final Exam</a>	50%	No	Formal Examination Period

### iLearn Quiz

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

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

Due: **Week 4**

Weighting: **10%**

The quiz will become available in Week 3 and due in Week 4. Please check the iLearn site for the exact due date and notice that the assessment could be due as early as at the beginning of Week 4 i.e. on Monday. The duration of the quiz will be 60 minutes. The exercises will assess the material covered in Lecture Weeks 1-2 and your ability to use statistical software to conduct

statistical analyses. It is your responsibility to find an appropriate location with a reliable internet connection where you can complete the exam. It is advisable to plan this in advance.

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.
- Understand 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: **20%**

For internal students: You will sit a test during your SGTA class. The test will be conducted under exam conditions, i.e., silently and with no communication between students. The duration of the test will be 40 mins. You may bring in a single page of A4 handwritten notes. The test will cover material from Lecture Weeks 1-5. For external students: Your Mid-Semester Test will be available as a link on iLearn over a period of time in Week 7. Please check the iLearn site for the exact date. The duration of the test will be 40 mins. It is your responsibility to find an appropriate location with a reliable internet connection where you can complete the exam. It is advisable to plan this in advance. The test will cover material from Lecture Weeks 1-5.

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.
- Understand 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: **20%**

The assignment will cover all learning outcomes and focus mainly on the material covered in Lecture Weeks 6-9.

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.
- Understand and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

## Final Exam

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

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

Due: **Formal Examination Period**

Weighting: **50%**

The Final Examination will be a two hour written exam (plus ten minutes reading time) and will be held during the examination period. The relevant statistical tables will be attached to the examination paper. Students will be permitted to take one A4 sheet, handwritten into the final examination. This sheet can be one-sided or two sided. This sheet must be submitted with your final exam paper at the conclusion of the final exam. The final exam will assess all the topics 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.
- Understand and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

<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

**We have 2 hours of lectures and 1 hour of SGTA per week.**

### Textbook

There is no prescribed textbook.

### Software

You are required to use R/RStudio to perform data analyses. You will use R/RStudio as part of the SGTA classes. You can find more information on RStudio at their web site: <https://www.rstudio.com/>. The software is freely available to download at no cost for all standard operating systems (Windows, Mac OS and Linux) at <https://www.rstudio.com/products/rstudio/download/>.

### Additional References

These recommended books are available in Reserve at the library.

- Moore, D.S., McCabe, G. P. and Craig, B.A. (2017) Introduction to the Practice of Statistics, Ninth Edition (W.H. Freeman)

## Unit Schedule

Week	Lectures	Work due
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 quiz
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 Exam

Week	Lectures	Work due
	Mid-Semester Break	
8	Multiple regression and model validation	
9	Extensions and examples of multiple regression	
10	Two-way ANOVA	
11	Two-way ANOVA continued and multiple comparisons	Assignment
12	Two-Way ANOVA and multiple regression connection	
13	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](#)
- [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](#) 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 Services and 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.

## Student Enquiries

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

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

## 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.