



FOSX1015

Statistical Concepts for Science

Session 1, Fully online/virtual 2020

Science and Engineering Faculty level units

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General Information

Unit convenor and teaching staff

Convenor and Lecturer

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Lecturer

Karol Binkowski

Administrative assistance

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Academic assistance

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Credit points

10

Prerequisites

Corequisites

Co-badged status

Unit description

This unit provides a broad introduction to statistical concepts and data analysis techniques. You will develop an understanding of statistical practice through a study of those techniques most commonly used in the sciences, social sciences and humanities. Topics covered in this unit include data collection methods, data quality, data summarisation, and statistical models such as the normal distribution, followed by sampling distributions and statistical inferences about means and proportions. Also studied are methods of analysis relating to comparisons, counted data and relationships, including regression and correlation. Statistical computer packages are used for handling and analysing data. However, no prior computing knowledge is assumed. This unit introduces vital skills for tertiary learning and explores their relationship to success in future careers.

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: Organise and summarise data graphically and numerically

ULO2: Analyse and solve problems about distributions and sampling distributions.

ULO3: Evaluate and apply statistical strategies to answer a research question.

ULO4: Draw conclusions from the results of a statistical analysis.

ULO5: Evaluate the appropriateness of statistical methodologies when analysing a variety of problems arising from other fields of research.

ULO6: Demonstrate foundational employability and self-directed learning skills, including recording academic achievements to link university study to future careers.

Assessment Tasks

Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

General Assessment Information

The data in the above table's "Estimated Time on Task" column is automatically generated, and potentially confusing. The times given for the tests (2 hours each) are just estimates; for each student, this will depend on how many times the test is attempted. The times allocated to foundation activities (0 hours) should be ignored; employability comprises 20% of this unit, and students should expect to spend some time on the activities.

HURDLES: All assessment tasks are hurdle requirements to pass this unit. These can be different for internal and external students. Details will be provided on the iLearn page for the unit.

TEST SUBMISSION: Each module's test will be online, via the iLearn page. Students may attempt each test as many times as they choose, prior to the end of Week 13, with the highest mark counting toward the student's grade. **For each test, a serious attempt (defined as a mark of at least 30%) must be made by the deadline in order to pass the unit.**

A student who does not make a serious attempt (that is, score at least 30%) on any test by its deadline will fail the unit, unless Special Consideration is granted. If you miss a test deadline due to circumstances out of your control, you may be eligible to apply for Special Consideration via [a sk.mq.edu.au](https://sk.mq.edu.au).

EMPLOYABILITY SKILLS: This unit has been designed so that 20% of student workload is allocated to employability skills. The employability skills modules are not graded, but the modules are hurdle tasks: you must complete the activities as outlined in order to pass this unit. Some activities will be automatically graded, but all will ask you to apply the modules to your work in

this unit, general university studies and your personal goals. You will be informed of any due dates, but most modules can be completed in your own time. See your iLearn unit for detailed information on how to complete the skills modules.

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

Delivery and Resources

Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

Classes

The statistics content will be delivered in classes from Week 1 to Week 11. Specifically, students should work through the following material on a weekly basis:

- A 2-hour lecture – recorded **Weeks 1–10**.
- A 1-hour SGTA on the topics of the previous lecture – **Weeks 1–11**. (Week 1 will introduce the employability module.)
- A 1-hour practical on the topics of the previous one or two lectures – **Weeks 2–11**.

Lecture notes and recordings and exercises from SGTA and practical classes will be available via iLearn. As an external student, you will be responsible for working through this material; you will not submit your solutions. Of course, you should contact your lecturers via email or the iLearn discussion forum when you have questions. It is important to keep up to date, so that you can complete the five module tests on time.

The details of activities in the employability module will be announced via iLearn.

Assistance

For help with any matters related to this unit, students should contact the appropriate department staff:

- for administrative matters, email stat1170.admin@mq.edu.au.
- for academic matters (e.g., help understanding the material, or questions about marks), email your lecturers at stat1170.academic@mq.edu.au.

Required and Recommended Texts and/or Materials

- A calculator with statistics mode will be essential.
- Software:
 - The software used in this unit is *Excel*, the spreadsheet application from Microsoft's *Office* suite. For students with Mac or Windows computers, this

application can be downloaded from the student portal. This can be accessed from the web page for Student IT services: http://students.mq.edu.au/it_service/s/. Students using other operating systems might find *Google Sheets* or *OpenOffice Calc* to be a workable alternative.

Recommended textbook used in this unit:

- *Modern Statistics: An introduction*, Don McNeil and Jenny Middledorp (ISBN 9781486007011). This can be purchased in hard copy from, for example, the Coop Bookshop or in e-format (ISBN 9781486022120).

Other recommended reading:

- Introduction to the Practice of Statistics, Moore, D.S. and McCabe, G. P (W.H. Freeman)
- Statistics without Tears by Rowntree (Penguin)
- Mind on Statistics by Utts & Heckard (Thomson, 2004)
- Elementary Statistics by Johnson & Kubly (Thomson, 2007)
- Statistics: The Art & Science of Learning from Data by Agresti & Franklin (Prentice Hall, 2007)
- The Statistical Sleuth by Ramsey and Schafer (Duxbury, 2002).

Technology Used and Required

iLearn (which is a version of Moodle) is used for delivery of course material and can be accessed at: <http://ilearn.mq.edu.au>.

Prizes

Don McNeil Prize for Introductory Statistics is named in honour of the foundation Professor of Statistics at Macquarie University. The prize is awarded twice per year to the student with the best overall performance in a first-year statistics unit.

Unit Schedule

Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult [iLearn](#) for latest details, and check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

In Weeks 1–10, the lectures will introduce the following topics. Each topic will be developed in SGTAs and Practicals in the following week.

Week 1	Data, research questions, graphics
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Week 2	Numerical data
Week 3	Introduction to distributions
Week 4	Sampling distributions
Week 5	Hypothesis tests for a population mean
Week 6	Comparing population means
Week 7	Simple linear regression
Week 8	Simple linear regression
Week 9	Categorical data analysis
Week 10	Categorical data analysis

Employability activities and assessment will occur throughout the semester, including Weeks 11–13.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Students seeking more policy resources can visit the [Student Policy Gateway \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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

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) 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

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.

Changes from Previous Offering

This new unit has been adapted from an earlier unit, STAT170, with some changes. The

statistical content has been modernised and streamlined (including changing software to Excel, and avoiding the use of statistical tables) to allow for the new employability content. The assessment structure has been altered, and the final exam eliminated.