STAT1170

Introductory Statistics

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Mathematical and Physical Sciences

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General Information

Unit convenor and teaching staff

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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, providing basic statistical knowledge. The unit is concerned with the development of an understanding of statistical practice and is illustrated by a study of those techniques most commonly used in the sciences, social sciences and humanities. The aim of statistical practice is to make the scientific research process efficient; for this reason statistics is used in disciplines ranging from accountancy to zoology.
Topics covered in this unit include: data collection methods; data quality; data summarisation; and statistical models like 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 along with word processing for reporting the results. However, no prior computing knowledge is assumed.

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.

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 activity participation (each 0 hours) should be ignored.

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.

ATTENDANCE and PARTICIPATION: Even if you are enrolled in online or special circumstances mode, you are required to engage with the lecture material each week. This will be monitored via short weekly participation quizzes; see the iLearn site for details. Please contact the unit convenor as soon as possible if you have difficulty completing any of these participation quizzes on time. There may be alternatives available to make up the work. If there are circumstances that mean you will miss a participation quiz, you can apply for Special Consideration via ask.mq.edu.au.

There is no participation requirement for Practicals or SGTAs for students enrolled in online or special circumstances mode (although you should work through this material to develop your understanding). Every student should enrol in a Practical class and an SGTA class. You may enrol in a class on campus if you plan to attend in person. Otherwise, please enrol in the online classes.

TEST SUBMISSION: Each statistics module's tests will be online, via the iLearn page. For some of the tests, multiple attempts are allowed; in this case, the highest mark counts toward the student's grade. **For each statistics module, at least 50% of the available marks must be scored in order to pass the unit.**

LATE SUBMISSION OF WORK: Late assessments are not accepted in this unit unless a Special Consideration has been submitted and approved. In this unit all the assessments are online quizzes, in-class activities, or scheduled tests, and these tasks must be undertaken at the time indicated in the unit guide. **Should these activities be missed due to illness or misadventure, students may apply for Special Consideration.** There is no non-timed assessment in this unit so late submission is not allowed without a successful special consideration request.

A student who does not pass any statistics module 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 ask.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.

Participation in lecture activities

Assessment Type [1]: Participatory task Indicative Time on Task [2]: 0 hours Due: **Weeks 1 to 10** Weighting: **0% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

Students are expected to demonstrate their ability to engage with the unit by weekly participation in lecture activities. Details will be provided on iLearn.

On successful completion you will be able to:

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

Foundation activities

Assessment Type [1]: Participatory task Indicative Time on Task [2]: 0 hours Due: **Throughout semester** Weighting: **0% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

Activities related to foundational employability and self-directed learning skills.

On successful completion you will be able to:

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

Module 1 Test

Assessment Type [1]: Quiz/Test Indicative Time on Task [2]: 2 hours Due: **Week 4** Weighting: **20% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

This quiz will test the ability of students to summarise a data set numerically and graphically, and to understand and interpret the output of such analyses.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.

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

Module 2 Test

Assessment Type [1]: Quiz/Test Indicative Time on Task [2]: 2 hours Due: **Week 6** Weighting: **20% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

This quiz will test the ability of students to analyse and solve statistical problems leveraging the properties of distributions and sampling distributions.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate the appropriateness of statistical methodologies when analysing a variety of problems arising from other fields of research.

Module 3 Test

Assessment Type [1]: Quiz/Test Indicative Time on Task [2]: 2 hours Due: **Week 8** Weighting: **20% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

This quiz will test the ability of students to answer research questions about population means.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.
- Draw conclusions from the results of a statistical analysis.

Module 4 Test

Assessment Type [1]: Quiz/Test Indicative Time on Task [2]: 2 hours Due: **Week 10** Weighting: **20% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

This quiz will test the ability of students to answer research questions about the linear relationship between two numerical random variables.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.

- Draw conclusions from the results of a statistical analysis.

Module 5 Test

Assessment Type [1]: Quiz/Test Indicative Time on Task [2]: 2 hours Due: **Week 12** Weighting: **20% This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

This quiz will test the ability of students to answer research questions about the appropriateness of models for a categorical random variable, and the independence of two categorical random variables.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.
- Draw conclusions from the results of a statistical analysis.

[1] 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.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Assessment Tasks

Name	Weighting	Hurdle	Due
Participation in lecture activities	0%	Yes	Weeks 1 - 10
Foundation activities	0%	Yes	Entire semester
Participation in SGTA classes	0%	Yes	Weeks 1 - 11
Participation in practical classes	0%	Yes	Weeks 1 - 11
Module 1 Test	20%	Yes	Week 4
Module 2 Test	20%	Yes	Week 6
Module 3 Test	20%	Yes	Week 8

Name	Weighting	Hurdle	Due
Module 4 Test	20%	Yes	Week 10
Module 5 Test	20%	Yes	Week 12

Participation in lecture activities

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Weeks 1 - 10**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Students are expected to demonstrate their ability to engage with the unit by weekly participation in lecture activities. Details will be provided on iLearn.

On successful completion you will be able to:

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

Foundation activities

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Entire semester**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Activities related to foundational employability and self-directed learning skills.

On successful completion you will be able to:

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

Participation in SGTA classes

Assessment Type [1]: Participatory task

Indicative Time on Task [2]: 0 hours
Due: **Weeks 1 - 11**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Students are expected to demonstrate their ability to engage with the unit by participating in SGTA classes.

On successful completion you will be able to:

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

Participation in practical classes

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Weeks 1 - 11**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Students are expected to demonstrate their ability to engage with the unit by participating in practical classes.

On successful completion you will be able to:

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

Module 1 Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 4**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This quiz will test the ability of students to summarise a data set numerically and graphically, and

to understand and interpret the output of such analyses.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Evaluate the appropriateness of statistical methodologies when analysing a variety of problems arising from other fields of research.

Module 2 Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 6**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This quiz will test the ability of students to analyse and solve statistical problems leveraging the properties of distributions and sampling distributions.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate the appropriateness of statistical methodologies when analysing a variety of problems arising from other fields of research.

Module 3 Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 8**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This quiz will test the ability of students to answer research questions about population means.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.
- Draw conclusions from the results of a statistical analysis.

Module 4 Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 10**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This quiz will test the ability of students to answer research questions about the linear relationship between two numerical random variables.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.
- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.
- Draw conclusions from the results of a statistical analysis.

Module 5 Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 12**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This quiz will test the ability of students to answer research questions about the appropriateness of models for a categorical random variable, and the independence of two categorical random variables.

On successful completion you will be able to:

- Organise and summarise data graphically and numerically.

- Analyse and solve problems about distributions and sampling distributions.
- Evaluate and apply statistical strategies to answer a research question.
- Draw conclusions from the results of a statistical analysis.

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[1] 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.

[2] 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

Off-shore students must email stat1170.admin@mq.edu.au as soon as possible to discuss study options.

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 1-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 1–11.** (Week 1 will introduce the employability module.)

Some activities will be available in connection to the employability modules, especially near the end of semester. Details will be announced via iLearn.

Assistance

For help with any matters related to this unit, students should contact the appropriate department staff, by emailing stat1170.admin@mq.edu.au.

Required and Recommended Texts and/or Materials

- A calculator with statistics mode may be useful during lectures.
- 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 for this unit:

- *Modern Statistics: An introduction*, Don McNeil and Jenny Middledorp (ISBN 9781486007011). This can be purchased in hard copy from www.booktopia.com.au/coop 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 & Kuby (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 (a version of Moodle) is used for delivery of course material and can be accessed at: http://ilearn.mq.edu.au.

Prizes

The 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

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
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://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). 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) 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

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 an

d 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 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/.

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.