STAT170

Introductory Statistics

S3 Day 2014

Statistics

Contents

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General Information

Unit convenor and teaching staff
Unit Convenor
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sigurbjorg.gudlaugsdottir@mq.edu.au
TBA
TBA

Credit points
3

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, proportions and quantiles. 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:

organise and summarise data graphically and numerically

use appropriate techniques to analyse data

use Minitab to manipulate and analyse data

draw conclusions from the results of data analysis

write a report based on the results of a statistical analysis

apply statistical techniques to problems arising from diverse fields of research

Assessment Tasks

Name	Weighting	Due
5 Hurdle Tests	10%	15/12, 19/12, 7/1, 16/1, 23/1
Assignment 1	6%	Saturday 3 January by 5pm
Assignment 2	12%	Monday 19 January by 5pm
Class Test	12%	Friday 9 January 11am
Final Examination	60%	University Examination Period

5 Hurdle Tests

Due: **15/12, 19/12, 7/1, 16/1, 23/1**
Weighting: **10%**

The Hurdle Tests are online quizzes that will be made available on iLearn at least five days prior to the due dates (at midnight on the relevant days). Students are allowed an unlimited number of attempts at each test until the deadline. The pass mark is indicated on each hurdle test. Inability to pass a test necessitates contacting the statistics lecturer via email (sigurbjorg.gudlaugsdottir@mq.edu.au). The highest score obtained will count towards the final grade. Each time a student attempts a test a new version of it will be generated. The quizzes are designed to give students an opportunity to practice theoretical, mechanical and interpretational aspects of statistics. Each test is worth 2%. Extensions will only be granted for cases in which an application for disruption to studies has been approved.

On successful completion you will be able to:

- use appropriate techniques to analyse data
- draw conclusions from the results of data analysis
- apply statistical techniques to problems arising from diverse fields of research

Assignment 1

Due: **Saturday 3 January by 5pm**
Weighting: **6%**

Assignment 1 provides students with an opportunity to develop and to apply sound statistical practice. This assessment task reinforces the concepts covered in lectures and the skills learned

from the practical material. The assignment will be made available on iLearn two weeks prior to the due date. Submission is to be made through the iLearn turnitin link before the due date and time, more details will be made available in the assignment. Penalties apply for late submissions. Assignments submitted one day after the deadline incur a 5 mark penalty. Assignments submitted two days after the deadline incur a 10 mark penalty. Assignments submitted more than two days late will be awarded a mark of 0. Extensions will only be granted for cases in which an application for disruption to studies has been approved.

On successful completion you will be able to:
- organise and summarise data graphically and numerically
- use appropriate techniques to analyse data
- use Minitab to manipulate and analyse data
- draw conclusions from the results of data analysis
- apply statistical techniques to problems arising from diverse fields of research

Assignment 2

Due: **Monday 19 January by 5pm**
Weighting: **12%**

Assignment 2 provides students with an opportunity to develop and to apply sound statistical practice. It reinforces the concepts covered in lectures and the skills learned from the practical material. This assignment requires students to use Minitab to analyse data using appropriate techniques and part of the assignment must be submitted in the form of a statistical report. The assignment will be made available on iLearn two weeks prior to the due date. Submission must be via the iLearn turnitin link only and details will be given in the assignment. Penalties apply for late submissions and are as for Assignment 1. Extensions will only be granted for cases in which an application for disruption to studies has been approved.

On successful completion you will be able to:
- organise and summarise data graphically and numerically
- use appropriate techniques to analyse data
- use Minitab to manipulate and analyse data
- draw conclusions from the results of data analysis
- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Class Test

Due: **Friday 9 January 11am**
Weighting: **12%**

The Class Test will be held **during the lecture class** on the 9th of January. A page of formulae and relevant statistical tables will be provided in the class test. A statistics calculator may be

taken into the class test. No other material (apart from writing equipment) will be permitted in the class test. A supplementary class test will be given for students with an approved disruption to studies application.

On successful completion you will be able to:

- use appropriate techniques to analyse data
- draw conclusions from the results of data analysis
- apply statistical techniques to problems arising from diverse fields of research

Final Examination

Due: **University Examination Period**
Weighting: **60%**

The Final Examination will be a three hour written exam (plus ten minutes reading time) and will be held during the Session 3 examination period. A page of formulae and relevant statistical tables will be attached to the final examination. Students will be permitted to take **one A4 sheet (any colour), handwritten on both sides** (using pens and/or pencils) into the final examination. This sheet must be submitted with your final exam paper at the conclusion of the exam. A statistics calculator may also be taken into the final examination. Important information on preparing for the final exam will be provided on iLearn.

The University Examination timetable will be available at:http://www.timetables.mq.edu.au/

Students are advised that 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, i.e. 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 Disruption to Studies via ask.mq.edu.au. A supplementary examination will only be granted if the student has been found to have had a significant disruption to studies**.**

Note that there is a University policy regarding requests for special consideration for examinations and the granting of supplementary examinations, which can be found at: http://students.mq.edu.au/student_admin/exams/disruption_to_studies/.

Students can submit disruption to studies request(s) through the following link: https://ask.mq.edu.au/

Grading in this Unit

The final Standardised Numerical Grade (SNG) in Stat170 will be based on students' work during the semester and in the Final Examination. The determination of the final SNG will be based on performance of individual assessment tasks against criteria and standards as detailed in the Grading Policy (see http://mq.edu.au/policy/docs/grading/policy.html). Final grades will be awarded on the basis of students' overall performance and the extent to which they demonstrate fulfillment of the learning outcomes listed for this unit.

Please note that students must perform satisfactorily in the Final Exam as well as the coursework in order to pass the unit.

On successful completion you will be able to:

- use appropriate techniques to analyse data

- draw conclusions from the results of data analysis

- apply statistical techniques to problems arising from diverse fields of research

Delivery and Resources

Classes

Students should enrol in and attend the following classes on each day:

- 1 x 2 hour lecture beginning on Day 1 (10 December)

- 1 x 1 hour compulsory tutorial beginning on Day 2 (12 December)

- 1 x 1 hour compulsory practical beginning one Day 2 (12 December)

The timetable for classes can be found on the University web site at: http://www.timetables.mq.edu.au

Students can change their tutorial and practical classes by using eStudent at: https://student1.mq.edu.au/

Prizes

Don McNeil Prize for Introductory Statistics

This prize is named in honour of the foundation Professor of Statistics at Macquarie University, Don McNeil, who has had an enormous impact on the teaching of first year statistics. The prize is awarded twice a year to the student with the best overall performance in the unit.

Required and Recommended Texts and/or Materials

- A calculator with statistics mode is essential and should be brought to all classes.

- The statistical software package Minitab can be downloaded from: http://students.mq.edu.au/home/ (click on Software Downloads).

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, access details to be provided in class).

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

Unit Web Page

Information relating to Stat170 can be found by visiting the Macquarie University Statistics Department web site. The URL for this site is: http://www.stat.mq.edu.au/

iLearn (which is a version of Moodle) is used for delivery of STAT170 course material and can be accessed at: http://ilearn.mq.edu.au

Unit Schedule

Day	Date	Lecture Topic	Assessment Due
D1	10/12	Introduction to statistics	
D2	12/12	Graphing data	
D3	15/12	Numerical summaries	**Hurdle 1 due on 15 December by 12 midnight**
D4	17/12	The Normal distribution	
D5	19/12	Distribution of means and proportions	**Hurdle 2 due on 19 December by 12 midnight**
		Christmas Break	
	3/1		**Assignment 1 due on 3 January by 5pm**
D6	5/1	Confidence intervals	
D7	7/1	One sample hypothesis test for a population mean	**Hurdle 3 due on 7 January by 12 midnight**
	9/1		**Class Test - held during Lecture time on Friday 9 January.** **There are no Tutorial or Practical Classes on this day.**
D8	12/1	Hypothesis tests for comparing population means	
D9	14/1	Simple linear regression (Part 1)	

D10	16/1	Simple linear regression (Part 2)	**Hurdle 4 due on 16 January by 12 midnight**
D11	19/1	Hypothesis tests for a population proportion: z-test and chi-squared goodness-of fit	**Assignment 2 due on 19 January by 5pm**
D12	21/1	Chi-squared test of independence	
D13	23/1	Review of STAT170	**Hurdle 5 due on 23 January by 12 midnight**

Learning and Teaching Activities

Lectures

Lectures begin on Day 1 (10 December). Students should attend one 2-hour session per day. Copies of the lecture slides will be made available via iLearn. Students should print out the lecture slides and bring the printout to lectures. The lectures are also recorded via 'echo360', and can be accessed on iLearn (under Echo Recordings).

Tutorials

Tutorials are compulsory and begin on Day 2 (12 December). Each tutorial is based on work from lecture material covered previously. The aim of tutorials is to practice techniques and understand concepts learned in lectures. Tutorials are designed for students to work together in groups. The emphasis on group work is to explore ideas, devise and ask questions and plan ways to answer them. Tutorial material will be made available via iLearn. Students should print out their tutorial material and bring the printout to their tutorial class each week.

Practicals

Practical classes are compulsory and begin on Day 2 (12 December). During these sessions students will be introduced to Minitab, a dedicated statistical package. Every class throughout the semester students will be required to work through practical material that teaches them how to apply techniques learned during lectures by using Minitab. The practical material is based on work from lecture material covered previously. Practical material, and the required Minitab datasets, will be made available via iLearn. Each day students should print out their practical material (available on iLearn) and bring it to their practical session. Students preferring to use their own computers to do the practical work may do so. Students with PCs running Windows will have to download Minitab from http://students.mq.edu.au/home/ (click on Software Downloads). Students using other operating systems will have to access Minitab via iLab. Instructions for downloading Minitab and accessing iLab will be provided on iLearn.

Help with STAT170 related administrative matters

For help with STAT170 related administrative matters students should contact Victoria Park, the STAT170 admin officer, via stat170.admin@mq.edu.au

Staff consultation (office) hours

Details of staff consultation days and times will be posted on iLearn.

Numeracy Centre

The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT170. Any student who lacks the knowledge of mathematics needed for STAT170 is encouraged to seek the help of the Centre, which is located in C5A 225. The Centre offers a number of services including individual help, supplementary workshops that run each week and an opportunity to meet with other students to discuss problems.

Computing Laboratories

Minitab will be used in practical sessions and for completing assignments. Assignments and quizzes can be completed in the computing labs in E4B. Computing labs now use iLab, so work undertaken must be saved to the iLab desktop and then emailed. Opening hours of computing laboratories during semester: 8am - 10pm Mon-Fri 9am - 5pm Sat-Sun For opening hours during semester breaks, see the notice boards outside the computing laboratories. Look for additional information on the whiteboards in the labs. Please note that computing labs may be booked for classes. Check the timetable on the door of the lab to make sure that the room is free.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of 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/support/student_conduct/

Student Support

Macquarie University provides a range of support services for students. For details, visit http://stu

dents.mq.edu.au/support/

Learning Skills

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

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

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

IT Help

For help with University computer systems and technology, visit http://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- draw conclusions from the results of data analysis
- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 1

- Assignment 2
- Final Examination

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 2
- Class Test
- Final Examination

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- organise and summarise data graphically and numerically
- use appropriate techniques to analyse data
- use Minitab to manipulate and analyse data
- draw conclusions from the results of data analysis
- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests

- Assignment 1
- Assignment 2
- Class Test
- Final Examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- use appropriate techniques to analyse data
- use Minitab to manipulate and analyse data
- draw conclusions from the results of data analysis
- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 1
- Assignment 2
- Class Test
- Final Examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- use appropriate techniques to analyse data
- use Minitab to manipulate and analyse data
- draw conclusions from the results of data analysis

- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 1
- Assignment 2
- Class Test
- Final Examination

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- Assignment 1
- Assignment 2
- Final Examination

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- organise and summarise data graphically and numerically
- write a report based on the results of a statistical analysis
- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- Assignment 1

- Assignment 2
- Final Examination

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 2
- Final Examination

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- apply statistical techniques to problems arising from diverse fields of research

Assessment tasks

- 5 Hurdle Tests
- Assignment 2
- Final Examination

Changes from Previous Offering

From semester 2 2013, all assignments are to be submitted only via iLearn. Details on how to do this may be found in iLearn and the assessment material. From semester 1 2014, hurdle tests replace StatQuizzes and PracQuizzes and some course content is different to 2013 and earlier.

Changes since First Published

Date	Description
28/02/2014	The Description was updated.