STAT670

Introductory Statistics

S1 External 2017

Dept of Statistics

Contents

General Information	2
Learning Outcomes	2
General Assessment Information	3
Assessment Tasks	3
Delivery and Resources	7
Unit Schedule	8
Learning and Teaching Activities	9
Policies and Procedures	10
Graduate Capabilities	12
Changes from Previous Offering	22
Changes since First Published	22

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Unit Convenor, Lecturer
Maurizio Manuguerra
maurizio.manuguerra@mq.edu.au
Contact via 9850 7838
12 Wally's Walk (E7A), office TBA
TBA on iLearn

Credit points
4

Prerequisites
Admission to MAppStat or GradDipAppStat or MBiotech or MRadiopharmSc or MSc

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:

Manipulate, classify and summarise different types of data both graphically and

numerically.

Deeply understand and apply appropriate statistical techniques for analysis of various types of data.

Use Minitab to organise, manipulate, summarise and analyse data.

Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.

Interpret statistical results and write a statistics report based on the results of a statistical analysis.

Identify and apply appropriate statistical methods to address a range of practical problems.

Have a deep understanding of the differences between one-sample and two-sample statistical tests and be able to apply the tests in statistical analysis.

General Assessment Information

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**.** If a supplementary examination is granted as a result of the disruption to studies process, the examination will be scheduled approximately two weeks after the conclusion of the official examination period.

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/

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment	10%	No	Sunday midnight Week 3
Mid-semester Exam	20%	No	Online in Week 7
Statistical Report	20%	No	Friday Week 12 by 5pm
Final Examination	50%	No	University Examination Period

Assignment

Due: **Sunday midnight Week 3**
Weighting: **10%**

The assignment provides students with an opportunity to develop and to apply sound statistical practice.

The assignment will assess:

- all the topics of Module 1 (weeks 1 and 2)
- ability to use Minitab to solve the exercises.

The assignment will be made available on iLearn one week 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 paper.

Penalties apply for late submissions. Assignments submitted on Monday after the deadline incur a 5% penalty. Assignments submitted on Tuesday incur a 10% penalty. Assignments submitted after Tuesday 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:

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Use Minitab to organise, manipulate, summarise and analyse data.
- Identify and apply appropriate statistical methods to address a range of practical problems.

Mid-semester Exam

Due: **Online in Week 7**
Weighting: **20%**

The mid-semester exam is a take-home exam and will be made available on iLearn in week 7. The start time will be from Thursday 13/04 at 5pm (week 7) to Wednesday 19/04 at 11pm (semester break). *Please note that Friday 14/04 and Monday 17/04 are public holidays.* From the moment students start the exam, they will have 45 minutes to:

- solve the questions on spare sheets;
- report the final results on iLearn.

It is the student's responsibility to find a appropriate location with a reliable internet connection where they can complete the exam. It is advisable to plan in advance.

The exam will assess:

- all the topics of Modules 1 and 2 (weeks 1-6)

The requirements will be similar to those of the final exam:

- Students will be permitted to take **one A4 sheet (any colour), handwritten on both sides** (using pens and/or pencils) into the examination. A page of formulae and relevant statistical tables will be given to students. Additionally students will be given blank sheets to work the questions. All the sheets must be submitted at the conclusion of the exam.
- A statistics calculator must be brought into the examination.

As the exam is not supervised, the requirements cannot be enforced by the teaching staff. It is advisable though that students choose to comply with them as this is a general test that will give students clear indications on the opportunity to withdraw without academic penalty (the last date to withdraw without academic penalty is 28/04).

On successful completion you will be able to:

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.

Statistical Report

Due: **Friday Week 12 by 5pm**
Weighting: **20%**

Students will be required to conduct statistical data analysis identifying and applying appropriate methods and techniques, interpret statistical results and summarise the results in a report. This assignment requires students to use Minitab to analyse data using appropriate techniques. The requirements for the report will be made available on iLearn one week prior to the due date. Submission must be via the iLearn turnitin link only and details will be given in the requirements for the report. Penalties apply for late submissions and are as for the Assignment. Extensions will only be granted for cases in which an application for disruption to studies has been approved.

The statistical report will assess:

- all the topics of Modules 3 and 4 (weeks 6-10)
- ability to use Minitab to solve the exercises.

On successful completion you will be able to:

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Use Minitab to organise, manipulate, summarise and analyse data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.
- Have a deep understanding of the differences between one-sample and two-sample statistical tests and be able to apply the tests in statistical analysis.

Final Examination

Due: **University 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. 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. See the week 13 iLearn important information for more details on preparing for the final exam.

The exam will assess:

- all the topics of stat170, i.e. Modules 1, 2, 3, 4, 5 (weeks 1-13)

****

The University Examination timetable will be available in draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations at:http://www.timetables.mq.edu.au/

Important:

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

On successful completion you will be able to:

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.
- Have a deep understanding of the differences between one-sample and two-sample statistical tests and be able to apply the tests in statistical analysis.

Delivery and Resources

Classes

STAT670 will be delivered remotely, and no classes are scheduled.

Students will be given the opportunity to watch STAT170-INT lecture recordings on iLearn.

Please note: there are no practical and tutorial classes, but students are expected to work trough the practical and tutorial notes, asking for assistance when this is needed.

Help with STAT670 Related Administrative Matters

For help with STAT670 related administrative matters students should contact Victoria Park, the STAT670 admin officer, via stat670.admin@mq.edu.au

Required and Recommended Texts and/or Materials

- A calculator with statistics mode is essential and should be brought to all classes.
- For students with PCs, the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. Students can opt for a simplified version of Minitab 17 called Minitab Express, which runs natively on both PCs and Macs. It can be downloaded at the same address as above and contains all the features needed in stat170 in a simpler interface. The only shortcoming is that the practical notes are based on Minitab 17

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, access details to be provided in class).

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, (which is a version of Moodle) is used for delivery of STAT670 course material and can be accessed at: http://ilearn.mq.edu.au

Unit Schedule

PART	MODULE	WEEK	LECTURE TOPIC	IN-CLASS ASSESSMENT
Basics	1	1	Introduction to statistics, Graphing data	**Assignment** [10 marks] • *Time: week 3* • *Topics: module 1 + Minitab* **Mid-semester exam** [20 marks] • *Time: week 7* • *Duration: 45 minutes* • *Topics: modules 1, 2*
		2	Numerical summaries	
	2	3	The Normal distribution	
		4	Distribution of means and proportions	
		5	Confidence intervals	
		6	More on populations and samples. Review of Modules 1, 2	
Tests	3	7	One sample hypothesis test for a population mean	**Statistical report** [20 marks] • *Time: week 12* • *Topics: modules 3, 4 + Minitab*
		2 wks break		
		8	Hypothesis tests for comparing population means	
	4	9	Simple linear regression (Part 1)	
		10	Simple linear regression (Part 2)	
	5	11	Hypothesis tests for a population proportion: z-test and chi-squared goodness-of fit	
		12	Chi-squared test of independence	

		13	Review of STAT170	

Tutorial and practical activities by week:

WEEK	LECTURE	TUTORIAL	PRACTICAL
1	L1	T1: Intro	P1: Intro
2	L2	T2: on L1	P2: on L1
3	L3	T3: on L2	P3: on L2
4	L4	T4: on L3	P4: on L3
5	L5	T5: on L4	P5: on L4
6	L6	T6: on L5	P6: on L5
7	L7	T7: on L6	There is no P7
8	L8	T8: on L7	P8: on L7
9	L9	T9: on L8	P9: on L8
10	L10	T10: on L9	P10: on L9
11	L11	T11: on L10	P11: on L10
12	L12	T12: on L11	P12: on L11
13	L13	T13: on L12	P13: on L12

Learning and Teaching Activities

Lectures

Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn. The lectures for stat170 students are recorded via ‘echo360’, and stat670 student should access them on iLearn (under Echo Recordings).

Tutorials

Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week’s lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.

Practicals

Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week's lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.

Staff consultation (office) hours

Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics Department website. No appointments are necessary during these hours.

Numeracy Centre

The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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_2016.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

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/

Results

Results shown in *iLearn*, 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.

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 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://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.

Graduate Capabilities

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

- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.

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

- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.

Assessment tasks

- Mid-semester Exam
- Statistical Report
- Final Examination

Learning and teaching activities

- Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn.

The lectures for stat170 students are recorded via ‘echo360’, and stat670 student should access them on iLearn (under Echo Recordings).

- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week’s lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.
- Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week’s lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.
- Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics Department website. No appointments are necessary during these hours.
- The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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.
- 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.

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:

Assessment task

- Mid-semester Exam

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

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Use Minitab to organise, manipulate, summarise and analyse data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical

problems.

- Have a deep understanding of the differences between one-sample and two-sample statistical tests and be able to apply the tests in statistical analysis.

Assessment tasks

- Assignment
- Mid-semester Exam
- Statistical Report
- Final Examination

Learning and teaching activities

- Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn. The lectures for stat170 students are recorded via 'echo360', and stat670 student should access them on iLearn (under Echo Recordings).
- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week's lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.
- Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week's lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.
- Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics

Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics Department website. No appointments are necessary during these hours.

- The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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.
- 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.

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

- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Use Minitab to organise, manipulate, summarise and analyse data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.
- Have a deep understanding of the differences between one-sample and two-sample

statistical tests and be able to apply the tests in statistical analysis.

Assessment tasks

- Assignment
- Mid-semester Exam
- Statistical Report
- Final Examination

Learning and teaching activities

- Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn. The lectures for stat170 students are recorded via 'echo360', and stat670 student should access them on iLearn (under Echo Recordings).
- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week's lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.
- Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week's lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.
- Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics

Department website. No appointments are necessary during these hours.

- The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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.
- 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.

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

- Deeply understand and apply appropriate statistical techniques for analysis of various types of data.
- Use Minitab to organise, manipulate, summarise and analyse data.
- Be able to check the assumptions underlying the statistical models; carry out a statistical analysis and draw conclusions from the results of data analysis.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.
- Have a deep understanding of the differences between one-sample and two-sample statistical tests and be able to apply the tests in statistical analysis.

Assessment tasks

- Mid-semester Exam
- Statistical Report
- Final Examination

Learning and teaching activities

- Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn. The lectures for stat170 students are recorded via 'echo360', and stat670 student should access them on iLearn (under Echo Recordings).
- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week's lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.
- Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week's lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.
- Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics Department website. No appointments are necessary during these hours.
- The Numeracy Centre exists to help students who are experiencing difficulties with

numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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.

- 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.

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

- Manipulate, classify and summarise different types of data both graphically and numerically.
- Interpret statistical results and write a statistics report based on the results of a statistical analysis.
- Identify and apply appropriate statistical methods to address a range of practical problems.

Assessment tasks

- Assignment
- Mid-semester Exam
- Statistical Report
- Final Examination

Learning and teaching activities

- Lectures begin in Week 1. Copies of the lecture slides will be made available via iLearn.

The lectures for stat170 students are recorded via ‘echo360’, and stat670 student should access them on iLearn (under Echo Recordings).

- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week’s lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.
- Practical classes begin in Week 2. During these sessions students will be introduced to Minitab, a dedicated statistical package. Every week 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 weekly practical material is based on work from the previous week’s lecture. Practical material, and the required Minitab datasets, will be made available via iLearn. For students with PCs the statistical software package Minitab 17 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_services/. For students with Mac computers, iLab can be used to access Minitab. Information on using iLab can also be found on the Student IT services web page. For both students with PCs or Macs, a reduced version of Minitab 17, called Minitab Express, is available for download at the same address. It contains everything they need in a cleaner and neater interface. The only shortcoming is that practical notes are based on Minitab 17.
- Members of the Statistics Department have consultation hours each week during which they are available to help students enrolled in Introductory Statistics. The Statistics Department is currently located on the 2nd floor of the Australian Hearing Hub Building. A list of consultation times will be made available both on iLearn and on the Statistics Department website. No appointments are necessary during these hours.
- The Numeracy Centre exists to help students who are experiencing difficulties with numeracy-based subjects such as STAT670. Any student who lacks the knowledge of mathematics needed for STAT670 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.
- 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.

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 and teaching activities

- Tutorials begin in Week 1. Each tutorial, except the first, is based on work from the previous week's lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures. stat670 students should keep in mind that 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.

Changes from Previous Offering

The assessment plan has been modified in content and times. Specifically the assignment has been scheduled well before the census date (in week 3) and the mid-semester exam before the academic census (in week 7).

Changes since First Published

Date	Description
24/02/2017	Minor change: the assignments will be made available one week before the due date, not 2 weeks.
17/02/2017	Mistake in duration of assessment task