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General Information

Convenor and teaching staff

Unit Convenor: Susan Crowe
Email: susan.crowe@mq.edu.au
Phone: 9850 8558
Office: E4A 538

Credit Points
3

Prerequisites
N/A

Corequisites
N/A

Co-badged status
This is not co-badged.

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.<br /> 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.<br /> 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.
Learning Outcomes

1. organise and summarise data graphically and numerically
2. use appropriate techniques to analyse data
3. use Minitab to manipulate and analyse data
4. draw conclusions from the results of data analysis
5. write a report based on the results of a statistical analysis
6. use the Internet for obtaining information and communicating with other students in online discussions
7. apply statistical techniques to problems arising from diverse fields of research
## Assessment Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Weight</th>
<th>Due Date</th>
<th>Linked Learning Outcomes</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework task</td>
<td>2%</td>
<td>19 Dec</td>
<td>1, 2, 4</td>
<td>Homework task</td>
</tr>
<tr>
<td>Assignment 1</td>
<td>6%</td>
<td>6 Jan</td>
<td>1, 2, 3, 4, 6, 8</td>
<td>Assignment 1</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>12%</td>
<td>22 Jan</td>
<td>1, 2, 3, 4, 5, 6, 8</td>
<td>Assignment 2</td>
</tr>
<tr>
<td>StatQuizzes</td>
<td>4%</td>
<td>19 Dec, 17 Jan</td>
<td>2, 4, 8</td>
<td>2 StatQuizzes (2% each)</td>
</tr>
<tr>
<td>PracQuizzes</td>
<td>6%</td>
<td>20 Dec, 7 Jan, 16 Jan, 24 Jan</td>
<td>2, 3, 4, 8</td>
<td>4 PracQuizzes (1.5% each)</td>
</tr>
<tr>
<td>Class Test</td>
<td>10%</td>
<td>10 Jan</td>
<td>2, 4, 8</td>
<td>Class Test</td>
</tr>
<tr>
<td>Final Examination</td>
<td>60%</td>
<td>University Examination Period</td>
<td>2, 4, 8</td>
<td>Final Examination</td>
</tr>
</tbody>
</table>

### Homework task

**Due Date:** 19 Dec  
**Weight:** 2%

This assessment task reinforces the concepts covered in lectures and the skills learned from the practical material. The homework questions will be given two teaching days prior to the due date. Details about questions and submission will be given on iLearn.

### Assignment 1

**Due Date:** 6 Jan  
**Weight:** 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 teaching days prior to the due date. Submission instructions will be given (on iLearn) when the assignment is made available. Penalties apply for late submissions.

### Assignment 2

**Due Date:** 22 Jan  
**Weight:** 12%

As for Assignment 1, 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. Part of this assignment must be submitted in the form of a statistical report. The assignment will be made available on iLearn two teaching days prior to the due date. Submission instructions will be given (on iLearn) when the assignment is made available. Penalties apply for late submissions.

2 StatQuizzes

**Due Date:** 19 Dec, 17 Jan  
**Weight:** 4%

The StatQuizzes will be made available on iLearn. StatQuiz1 and StatQuiz2 should be completed in your own time (within available dates) on any PC that is connected to the internet. Each of the StatQuizzes will be made available on iLearn two teaching days prior to the due dates and no extensions will be given. Students are allowed three attempts at each StatQuiz. The highest score obtained will count towards the grade. Each time a student downloads a StatQuiz a new version of it will be generated. The quizzes are designed to give students an opportunity to practice theoretical and mechanical aspects of statistics. Each StatQuiz is worth 2%.

4 PracQuizzes

**Due Date:** 20 Dec, 7 Jan, 16 Jan, 24 Jan  
**Weight:** 6%

The PracQuizzes will be made available on iLearn. All four PracQuizzes should be completed in your own time (within available dates) on any PC that is connected to the internet. Each of the PracQuizzes will be made available on iLearn two teaching days prior to the due dates and no extensions will be given. The PracQuizzes are based on the questions posed in the Practical material. It is therefore very important that students complete the relevant practical worksheets prior to attempting the PracQuizzes. Students are allowed two attempts at each PracQuiz. The highest score obtained will count towards the final grade. Each PracQuiz is worth 1.5%.

Class Test

**Due Date:** 10 Jan  
**Weight:** 10%

The Class Test will be held in on Friday 10 January, in the usual lecture time. Note that it will be held in a room which is not the usual lecture theatre - see iLearn for an announcement of the venue. A page of formulae and relevant statistical tables will be attached to 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.

Final Examination

**Due Date:** University Examination Period  
**Weight:** 60%

The Final Examination will be a three hour written exam (plus ten minutes reading time) and will be held during the examination period which runs from 28 to 31 January 2014. A page of formulae and relevant statistical tables will be attached to the final examination. Students will be permitted to take one A4 sheet, handwritten on both sides, 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.
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 wish to consider applying for Special Consideration.

A supplementary examination will only be granted if a student has a satisfactory coursework (Assignments, Quizzes, Class Test) record (i.e. at least 20 marks out of 40). If a supplementary examination is granted as a result of the special consideration process, the examination will be scheduled 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://www.mq.edu.au/policy/docs/special_consideration/policy.html.

Students can submit a special consideration request(s) through the following link: https://ask.mq.edu.au/index.php

**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.

Although the Final Exam is nominally worth 60%, marks are not simply added together from the various assessments to produce the final grade. A student must achieve the performance standard defining a particular grade (as described in the Grading Policy) in both the coursework (Assignments, Quizzes, Class Test) and the Final Exam of the unit in order to earn that grade. For example, student’s performance needs to be judged of a credit standard in both the coursework (Assignments, Homework, Quizzes, Class Test) and the Final Exam to be awarded a credit grade.

Please note that students must perform satisfactorily in the Final Exam as well as the coursework in order to pass the unit.
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<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>LECTURE TOPIC</th>
<th>Assessment Due</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Note that the due dates and times for the Homework, Assignments and Quizzes will be available on iLearn.</td>
</tr>
<tr>
<td>D1</td>
<td>11/12</td>
<td>Introduction to statistics</td>
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<tr>
<td>D2</td>
<td>13/12</td>
<td>Graphing data</td>
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</tr>
<tr>
<td>D3</td>
<td>16/12</td>
<td>Numerical summaries</td>
<td>StatQuiz Demo (does not count towards assessment)</td>
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<td>D4</td>
<td>18/12</td>
<td>The Normal distribution</td>
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<tr>
<td></td>
<td>19/12</td>
<td></td>
<td>StatQuiz 1 (based on Lecture material from Weeks 1 - 3) Homework</td>
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<td>D5</td>
<td>20/12</td>
<td>Distribution of means and proportions</td>
<td>PracQuiz 1 (based on Practical material from Weeks 2 - 4)</td>
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<td></td>
<td>6/1</td>
<td>Confidence intervals</td>
<td>Assignment 1</td>
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<td></td>
<td>7/1</td>
<td></td>
<td>PracQuiz 2 (based on Practical material from Weeks 5 and 6)</td>
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<tr>
<td>D7</td>
<td>8/1</td>
<td>One sample hypothesis test for a population mean</td>
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<td>10/1</td>
<td></td>
<td>Class Test (held during Lecture time on Friday 10 January)</td>
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<td>D8</td>
<td>13/1</td>
<td>Hypothesis tests for comparing population means</td>
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<tr>
<td>D9</td>
<td>15/1</td>
<td>One and two sample hypothesis tests for population proportions</td>
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<tr>
<td>Date</td>
<td>Session</td>
<td>Activity</td>
<td>Date</td>
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<td>16/1</td>
<td></td>
<td>PracQuiz 3 (based on Practical material from Weeks 7 - 9)</td>
<td>D10</td>
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<tr>
<td>D11</td>
<td>20/1</td>
<td>Simple linear regression (Part 2)</td>
<td></td>
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<tr>
<td>D12</td>
<td>22/1</td>
<td>Categorical data analysis</td>
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<tr>
<td>D13</td>
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<td>Review of STAT170</td>
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Delivery and Resources

Classes

Students should attend the following classes each teaching day:

- 1 x 2 hour lecture beginning on Day 1 (11 December)
- 1 x 1 hour tutorial beginning on Day 1
- 1 x 1 hour practical beginning on Day 1

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:


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 extensively in STAT170 and can be accessed at:
http://ilearn.mq.edu.au

Teaching and Learning Strategy

Lectures
Lectures begin on Day 1. Students should attend one 2-hour session per teaching 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 begin on Day 1. Each tutorial is based on work from that day’s lecture. The aim of tutorials is to
practise 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. We believe that working within a group framework will be beneficial for the
educational and personal development of students. 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
Every teaching day students will be required to work through practical material that teaches them how to
apply techniques learned during lectures by using the statistical computer package, Minitab. The practical
material is based on work from that day’s lecture. Practical material, and the required datasets, will be
made available via iLearn.

Practical classes begin on Day 1. During these sessions students will be introduced to Minitab. Students
should print out their practical material (available on iLearn) and bring it to their practical session each
week. Prior to (or during) each practical session, students will need to download the weekly Minitab data
files (from iLearn) onto a storage device (such as a memory stick).

Students preferring to use their own personal computers to do the practical work will have to download
Minitab from http://students.mq.edu.au/home/ (click on Software Downloads). This download only works
in Windows. Students using other operating systems will have to access Minitab via iLab. Instructions for
downloading Minitab and accessing iLab will be provided on iLearn.

Extra help is available for students enrolled in Stat170. Students can seek help from the following sources:

Help with STAT170 related administrative matters
For help with STAT170 related administrative matters students should contact lecturing staff via
stat170.admin@mq.edu.au

Staff consultation hours
Details of staff consultation 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 CSA 225. The Centre offers a number of services including individual help and an opportunity to meet with other students to discuss problems. Information about access to the Numeracy Centre in Session 3 will be posted on iLearn.

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. Students will need to bring a memory stick when using the computers in these labs. Students may download the software program, Minitab, from http://students.mq.edu.au/home/ (click on Software Download) and install it on a personal computer that runs Windows.

For opening hours during Session 3, 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.

What Has Changed

From semester 2, 2013 all assessments (homework and assignments) are to be submitted via iLearn only. Details on how to do this may be found in iLearn and the assessment material. Practicals will run for the whole semester in S3, 2013.
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:

- **Special Consideration Policy** [http://www.mq.edu.au/policy/docs/special_consideration/policy.html](http://www.mq.edu.au/policy/docs/special_consideration/policy.html)

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Support

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: [http://students.mq.edu.au/support/](http://students.mq.edu.au/support/)

**UniWISE provides:**

- Online learning resources and academic skills workshops [http://www.mq.edu.au/learning_skills/](http://www.mq.edu.au/learning_skills/)
- Personal assistance with your learning & study related questions.
- The Learning Help Desk is located in the Library foyer (level 2).
- Online and on-campus orientation events run by Mentors@Macquarie.

Student Enquiry Service

Details of these services can be accessed at [http://www.student.mq.edu.au/ses/](http://www.student.mq.edu.au/ses/).

Equity Support

Students with a disability are encouraged to contact the Disability Support Unit who can provide appropriate help with any issues that arise during their studies.

IT Help

If you wish to receive IT help, we would be glad to assist you at [http://informatics.mq.edu.au/help/](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 and it outlines what can be done.
Graduate Capabilities

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 Outcome**

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

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 Outcome**

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

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 Outcome

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

### 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 Outcome

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

### 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 Outcome

1. use the Internet for obtaining information and communicating with other students in online discussions
2. apply statistical techniques to problems arising from diverse fields of research

### 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**

1. apply statistical techniques to problems arising from diverse fields of research

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**

1. apply statistical techniques to problems arising from diverse fields of research

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 Outcome**

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

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:

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<tr>
<th>Learning Outcome</th>
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<tr>
<td>1. apply statistical techniques to problems arising from diverse fields of research</td>
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