



STAT170 – Introductory Statistics

Session 3, 2012

Unit Guide

Unit Convener: Sue Crowe

Students in this unit should read this unit outline carefully at the beginning of semester. It contains important information about the unit. If anything in it is unclear, please consult the Unit Convenor.

About this unit

Stat170 is a three credit point unit offered by the Department of Statistics in the Faculty of Science. It can be taken day or evening in either semester, or externally in first semester. There are no prerequisites or corequisites for this unit.

Stat170 is a prerequisite for most 200 level statistics units and will be the first statistics unit taken by students intending to major in Statistics. It is also a requirement for many other areas of study and, as such, is a required unit for a number of courses at Macquarie University.

Students who complete their studies after the end of 2012 will be required to complete at least one unit of study designated 'People', and one designated 'Planet', regardless of their chosen discipline. The primary aim is to encourage students to study some units outside of their primary discipline. 'People' units of study are intended to focus on the development of what it means to be engaged and ethical local and global citizens. 'Planet' units of study are intended to help students to understand the nature of science and the challenges and issues facing the world at present. STAT170 has been designated a 'Planet' unit.

Teaching Staff

Sue Crowe: email: susan.crowe@mq.edu.au
Help with STAT170 related administrative matters: email: stat170.admin@mq.edu.au

Classes

Students should attend the following classes each teaching day:

- ❖ 1 x 2 hour lecture
- ❖ 1 x 1 hour tutorial
- ❖ 1 x 1 hour practical

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/>

Text books and other material

- 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), or via iLab (information is available from the Department of Statistics web page <http://stat.mq.edu.au/>)

Suggested texts and recommended reading:

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

Unit Objectives

Stat170 provides a broad introduction to statistical practice and data analysis techniques. It aims to equip students with a basic understanding of statistics, such that they are able to employ appropriate methods of analysis in various circumstances. The techniques learned are widely used in the sciences, social sciences, business and many other fields of study. Topics covered include study design, data collection and analysis, statistical inference, linear regression, and analysis of categorical data.

Learning Outcomes

On completion of this unit students should be able to:

- ✓ organise and summarise data graphically and numerically (Graduate Capability 1)
- ✓ use appropriate techniques to analyse data (Graduate Capabilities 1, 2, 3)
- ✓ use Minitab to manipulate and analyse data (Graduate Capabilities 1, 2, 3)
- ✓ draw conclusions from the results of data analysis (Graduate Capabilities 1, 2, 3, 8)
- ✓ write a report based on the results of a statistical analysis (Graduate Capabilities 1, 2, 3, 6, 8)
- ✓ use the Internet for obtaining information and communicating with other students in online discussions (Graduate Capability 4)
- ✓ work co-operatively as a member of a team (Graduate Capability 4)
- ✓ apply statistical techniques to problems arising from diverse fields of research (Graduate Capabilities 1, 2, 3, 4, 5, 6, 7, 8, 9)

Graduate Capabilities

In addition to discipline specific learning outcomes (listed above), all academic programs at Macquarie assist students to develop or enhance capabilities in a range of areas. The Macquarie Graduate Capabilities are shown below. The relation between Graduate Capabilities and student learning are shown in the 'Learning Outcomes' section (see above).

Graduate Capability
1. Discipline specific knowledge and skills
2. Critical, analytical and integrative thinking
3. Problem solving and research capability
4. Effective communication
5. Socially and environmentally active and responsible
6. Creative and innovative
7. Commitment to continuous learning
8. Capable of professional and personal judgement and initiative
9. Engaged and ethical local and global citizens

Unit Web pages

Information relating to Stat170 can be found by visiting the Macquarie University Department of Statistics 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>

The Forums on iLearn can be used to communicate with other students and staff.

Teaching and Learning Strategy

Lectures

Lectures begin on Monday 17 December. Students are expected to attend one 2-hour session per teaching day (the equivalent of one week of the Session 1 or 2 Stat170 offering). 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 Monday 17 December. Students are expected to attend one 1-hour tutorial session per teaching day. Each tutorial is based on work from the previous 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 questions will be made available via iLearn. Students should print out their tutorial material and bring the printout to their tutorial class each week, where the questions and potential solutions will be discussed. Tutorial solutions will not be available on iLearn.

Practicals

Practicals begin on Monday 17 December. Students are expected to attend one 1-hour practical session per teaching day. Each practical session is based on work from the previous lecture. During these sessions you will use the statistical computer package Minitab and the techniques learned during lectures to help solve statistical problems. Practical material, and the required datasets, will be made available via iLearn. Students should print out their practical material and bring the printout to their practical session each week. Prior to (or during) each practical session, students will need to download the weekly Minitab data files onto a storage device (such as a USB).

Grading in this Unit

Your final SNG and grade in Stat170 will be based on your work during the semester and in the final examination. —The determination of your final SNG and Grade will be based on an assessment of your performance on individual assessment tasks against identified criteria and standards as detailed on the following page. 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 examination is nominally weighted at 60%, note that the SNG allocated to your performance is NOT your raw mark as aggregated from the individual assessment components of the assessment mark.

Please note that a student must meet the performance standard outlined below in **both the coursework and the examination sections of this unit in order to be awarded a particular grade**. For example, your performance needs to be judged of a credit standard in both the coursework **and** the examination section of the unit to be awarded a credit grade.

The relationship between SNGs and final grades is shown in the table below:

SNG Range	Grade	Standard
85 - 100	High Distinction (HD)	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the discipline.
75 - 84	Distinction (D)	Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.
65 - 74	Credit (Cr)	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the discipline.
50 - 64	Pass (P)	Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.
0 - 49	Fail (F)	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

Students obtain constant **feedback** throughout the course by attending lectures, tutorials, practical sessions, as well as by completing assessment tasks and participating in forum discussions. Please do not hesitate to ask your lecturer, tutor, or practical demonstrator for help and advice if you need it.

Assessment

Macquarie University Assessment Policy can be accessed at:

<http://www.mq.edu.au/policy/docs/assessment/policy.html>

In Stat170 the relative weighting given to assessment tasks is as follows:

COURSEWORK Section		EXAMINATION section	
Assignment 1	5%	Class Test	15%
Assignment 2	12%	Final Examination	60%
2 StatQuizzes (2% each)	4%		
4 PracQuizzes (1% each)	4%		

Coursework Section:

25% total

The two assignments, the two StatQuizzes (offered via iLearn) and the four PracQuizzes (offered via iLearn) are designed to allow students to further develop their understanding of the material presented in lectures, tutorial and practical sessions. The online quizzes (both the StatQuizzes and the PracQuizzes) provide students with timely feedback and the opportunity for students to assess their progress. Furthermore the PracQuizzes provide students with timely feedback on their work performed during the Practical sessions.

StatQuizzes

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 four teaching days prior to the due dates. 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%. The due dates are provided in the Unit Schedule on page 9.

There is a demo StatQuiz available on iLearn. This demo StatQuiz is designed to give students an opportunity to familiarize themselves with the Quiz System in iLearn, and with the different types of questions used in the quizzes. Students can have up to five attempts at the demo StatQuiz. The demo StatQuiz does not count towards assessment marks.

PracQuizzes

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 four teaching days prior to the due dates. 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 grade. Each PracQuiz is worth 1%. The due dates are provided in the Unit Schedule on page 9.

Assignments

There are two assignments in STAT170. They will be made available on iLearn four teaching days prior to the due dates (due dates are provided in the Unit Schedule on page 9). Assignment 1 is worth 5% and Assignment 2 is worth 12%. Completed assignments should be submitted by the due times and dates in the assignment boxes located in E6A, Ground Floor, otherwise penalties will be levied. Assignments provide an opportunity to develop and to apply sound statistical practice. They reinforce the concepts covered in lectures and the skills learned in practical sessions.

Examination Section:

75% total

The class test and final examination are both used to assess students' understanding of the material presented in the unit.

Class Test

The Class Test will be held in your tutorial class in Day 8. You must sit the class test in the tutorial class in which you are registered. 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

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 29 January 2013 to 1 February 2013.

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. A statistics calculator may also be taken into the final examination.

Please note that students must perform satisfactorily in the final examination as well as the coursework section in order to pass the unit.

The University Examination timetable is scheduled to be available on 14 January 2013:

<http://www.timetables.mq.edu.au/exam>

The only exception to 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 record (**i.e. at least 15 percentage points**). 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 links:

<https://ask.mq.edu.au/index.php> or

http://web.science.mq.edu.au/undergraduate_programs/current/admin_central/

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.

Academic Honesty Policy

Academic honesty is an integral part of the core values and principles contained in the Macquarie University Ethics Statement. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. Students must read the University's policy on Academic Honesty. This can be found on the MQ web site at:

http://www.mq.edu.au/policy/docs/academic_honesty/policy.html. Failure to comply with the

Academic Honesty Policy can result in penalties being issued. **Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.**

Student Support Services

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: <http://www.student.mq.edu.au/>

Extra help is available for students enrolled in Stat170. Students can seek help from the following sources at various times when they think it may be beneficial to them:

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

Consultation times will be notified via 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. Information about how students can download the software program, Minitab, can be obtained Macquarie University Department of Statistics web site.

Opening hours of computing laboratories:

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.

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UNIT SCHEDULE

WEEK (Session 1, 2 equivalent)	Day	LECTURE TOPIC	Assessment Due <i>Note that the Assignments, the StatQuizzes and the PracQuizzes are due by 4pm on relevant days.</i>
W1	Mon 17 Dec	Introduction to statistics	-
W2	Wed 19 Dec	Graphing data	-
W3	Thu 20 Dec	Numerical summaries	StatQuiz Demo (does not count towards assessment)
CHRISTMAS BREAK			
W4	Mon 7 Jan	The Normal distribution	StatQuiz 1 (based on Lecture material from Weeks 1 - 3)
W5	Wed 9 Jan	Distribution of means and proportions	PracQuiz 1 (based on Practical material from Weeks 2 - 4)
W6	Thu 10 Jan	Confidence intervals	Assignment 1
W7	Mon 14 Jan	One sample hypothesis test for a population mean	PracQuiz 2 (based on Practical material from Weeks 5 and 6)
W8	Wed 16 Jan	Hypothesis tests for comparing population means	Class Test (held during tutorials)
W9	Thu 17 Jan	One and two sample hypothesis tests for population proportions	StatQuiz 2 (based on Lecture material from Weeks 4 - 8)
W10	Mon 21 Jan	Simple linear regression (Part 1)	PracQuiz 3 (based on Practical material from Weeks 7 - 9)
W11	Wed 23 Jan	Simple linear regression (Part 2)	Assignment 2
W12	Thu 24 Jan	Categorical data analysis	
	Fri 25 Jan		PracQuiz 4 (based on Practical material from Weeks 10 - 12)

Due dates for Quizzes

The due dates for the PracQuizzes and the StatQuizzes are given on iLearn. The quizzes will be made available to students 4 teaching days prior to the due dates. Students can have up to **two** attempts at each of the PracQuizzes and up to **three** attempts at each of the StatQuizzes. The **highest** score obtained will count towards the final grade. Due dates for the quizzes will not be extended.