STAT170 – Introductory Statistics

Session 2, 2012

Unit Guide

Unit Convener: Anne Karpin

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 one of the teaching staff in the unit.

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 offered in a different format from First Semester 2012 onwards. The lecture notes are different from last year and the assessments are also somewhat different. The underlying content is the same, however.

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

Petra Graham	Tel: 9850 6138	email: petra.graham@mq.edu.au
Anne Karpin:	Tel: 9850 9617	email: anne.karpin@mq.edu.au
Di Warren:		email: diana.warren@mq.edu.au
Help with STAT170 related administrative matters:		email: stat170.admin@mq.edu.au

Classes

Students should attend the following classes each week:

- ❖ 1 x 2 hour lecture beginning in Week 1
- ❖ 1 x 1 hour tutorial beginning in Week 2
- ❖ 1 x 1 hour practical beginning in Week 2

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).

Suggested texts and recommended reading:
- Intro Stat – Macquarie University (ISBN 978 1 4425 4258 7)
- 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)

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' session (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 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

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

Teaching and Learning Strategy

Lectures
Lectures begin in Week 1. Students should attend <u>one</u> 2-hour session per week. 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 in Week 2 Each tutorial is based on work from the previous week'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
Practicals begin in Week 2. Each practical session is based on work from the previous week's 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).

Assessment Criteria

Three core criteria will be used to assess students' work:
- Knowledge Development: Understanding of key ideas and concepts.
- Application: Ability to apply statistical concepts to actual problems.
- Presentation: The extent to which work has been written and/or presented in a manner consistent with accepted academic standards.

Performance in relation to each of these criteria will be assessed against established standards.

Assessment

Macquarie University Assessment Policy can be accessed at:
        http://www.mq.edu.au/policy/docs/assessment/policy.html

COURSEWORK Section		EXAMINATION section	
Assignment 1	5%	Class Test	15%
Assignment 2	10%	Final Examination	55%
2 StatQuizzes (2.5% each)	5%		
4 PracQuizzes (2.5% each)	10%		

Coursework Section: 30 marks 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 *5 marks*

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 weeks 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 2.5%. The due dates are provided in the Unit Schedule on page 9.

There is a demo StatQuiz available on iLearn (listed under Week 2). 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 *10 marks*

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 weeks 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 2.5%. The due dates are provided in the Unit Schedule on page 9.

Assignments *15 marks*

There are two assignments in STAT170. They will be made available on iLearn two weeks 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 10%. 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: 70 marks total

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

Class Test *15 marks*

The Class Test will be held in your tutorial class in week 8. You must sit the class test in the tutorial class you are registered in. Alternative arrangements will be made for the class test for students in the Monday tutorials as Monday of week 8 is a public holiday. 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 *55 marks*

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 12th November 2012 to 30th November 2012.

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 in order to pass the unit.

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/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 marks out of 30).** If a supplementary examination is granted as a result of the special consideration process, the examination will be scheduled <u>after</u> 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**.

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 as specified in the 'Assessment' section. 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 set out in the section titled 'Assessment Criteria', and an assessment of overall performance in the unit. 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.

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.

Please note that a student must meet the performance standard outlined above in **both** the coursework **and** the examination sections of this unit in order to be awarded a particular grade.

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.

Student Support Services

Macquarie University provides a range of Academic Student Support Services. Details of these services can 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
Members of the Statistics Department have consultation hours each week when they are available to help students enrolled in Introductory Statistics. These consultation hours will be listed on the doors of the Statistics staff located on the 5th floor of E4A. The list will also be available both on iLearn and on the Statistics Department website.

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. 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.

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.

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 each semester to the student with the best overall performance in the unit.

STAT170 Introductory Statistics: Second Semester 2012
UNIT SCHEDULE

WEEK	WEEK STARTING	LECTURE TOPIC	Assessment Due *Note that the Assignments, the StatQuizzes and the PracQuizzes are due by 5pm on Wednesdays in relevant weeks.*
W1	30 July	Introduction to statistics	-
W2	6 August	Graphing data	-
W3	13 August	Numerical summaries	StatQuiz Demo (does not count towards assessment)
W4	20 August	The Normal distribution	StatQuiz 1 (based on Lecture material from Weeks 1 - 3)
W5	27 August	Distribution of means and proportions	PracQuiz 1 (based on Practical material from Weeks 2 - 4)
W6	3 September	Confidence intervals	**Assignment 1**
W7	10 September	One sample hypothesis test for a population mean	PracQuiz 2 (based on Practical material from Weeks 5 and 6)
SEMESTER BREAK: 15 September – 1 October			
W8	2 October Note: Public Holiday - Monday 1 October	Hypothesis tests for comparing population means	**Class Test (held during Tutorials in Week 8 – alternative arrangements will be made for Monday tutorials)**
W9	8 October	One and two sample hypothesis tests for population proportions	StatQuiz 2 (based on Lecture material from Weeks 4 – 8)
W10	15 October	Simple linear regression (Part 1)	PracQuiz 3 (based on Practical material from Weeks 7 - 9)
W11	22 October	Simple linear regression (Part 2)	**Assignment 2**
W12	29 October	Categorical data analysis	-
W13	5 November	Review of STAT170	PracQuiz 4 (based on Practical material from Weeks 10 - 12)

Due dates for Quizzes

The PracQuizzes and the StatQuizzes will be made available to students two weeks 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.