STAT170 – Introductory Statistics

Session 3 2011

Unit Outline

Unit Convener: Dr Di Warren

Students in this unit should read this unit outline carefully at the beginning of Session. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit. The definitive version of the Unit Outline appears on Blackboard. If there are any discrepancies between this printed version and the version on Blackboard, the one on Blackboard is final. Please do check occasionally for any changes.

About this unit

STAT170 is a three credit point unit offered by the Statistics department in the Faculty of Science. It can be taken day or evening in Sessions 1 and 2, externally in Session 1, and as a day course in Session 3. There are no prerequisites or co-requisites for this unit.

For Session 3 2011, the textbook, CD (comes with the textbook), and lecture, tutorial & practical notes are the same as for Session 2 2011, but the assessment structure is 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 (Unit Cordinator)

Dr Di Warren   email: unistats@netspace.net.au

Classes

Students should attend the following classes on each Teaching Day:

- 1 x 2 hour lecture beginning on Wednesday 4 January.
- 1 x 1 hour tutorial beginning on Wednesday 4 January.
- 1 x 1 hour practical beginning on Wednesday 4 January.

	Monday		Wednesday		Friday	
9:00-11:00	Lecture		Lecture		Lecture	
11:30-12:30	Tutorial1	Practical1	Tutorial1	Practical1	Tutorial1	Practical1
12:30-1:30	Tutorial2	Practical2	Tutorial2	Practical2	Tutorial2	Practical2
1:30-2:30	Tutorial3	Practical3	Tutorial3	Practical3	Tutorial3	Practical3

At the end of the 1st lecture, students will be allocated to 1 tutorial & 1 practical for each Teaching Day. The number of tutorial and practicals is subject to enrolments.

Text books and other material

Students will need to purchase:

- **Intro Stat – Macquarie University** (ISBN 978 1 4425 4258 7). This comes with a CD. It is available from the University Co-op bookshop.
- **A calculator with statistics mode**. This is essential and should be brought to all classes.

Suggested additional 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 & Kuby (Thomson, 2007)
- Statistics for the Life Sciences by Samuels & Witmer (Prentice Hall, 2003)
- Statistics: Informed Decisions Using Data by Sullivan (Prentice Hall, 2004)
- Statistics: The Art & Science of Learning from Data by Agresti & Franklin (Prentice Hall, 2007)
- The Statistical Sleuth by Ramsey and Schafer (Duxbury, 2002)
- Intro Stats by De Veaux, Velleman and Bock (Pearson, 2006)

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)

In addition to discipline specific learning outcomes, 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 under 'Learning Outcomes'.

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/
- **Blackboard** is used extensively in STAT170 and can be accessed at: http://learn.mq.edu.au The Discussion Board on Blackboard can be used to communicate with other students and staff.

Teaching and Learning Strategy

Lectures

- Lectures begin on Wednesday 4 January.
- Copies of the lecture slides will be made available on Blackboard.

Tutorials

- Tutorials begin on Wednesday 4 January.
- Copies of the tutorials will be made available on Blackboard.
- Tutorials are based on work from the previous lecture. The aim of tutorials is to practise techniques and understand concepts learned in lectures.

Practicals

- Practicals begin on Wednesday 4 January.
- Copies of the practicals will be made available on Blackboard.
- 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.

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 and Code of Practice can be accessed at:

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

COURSEWORK Section		EXAMINATION section	
Assignments	30%	Class Test	15%
		Final Examination	55%

Please note that a student must meet the performance standard outlined on page 7 in **both** the coursework **and** the examination sections of this unit in order to be awarded a particular grade.

COURSEWORK Section: **<u>30 marks total</u>**

Assignments   **30 marks**

- Assignments provide an opportunity to develop and to apply sound statistical practice. Assignments are designed to allow students to further develop their understanding of the material presented in lectures, tutorial and practical sessions. They reinforce the concepts covered in lectures and the skills learned in practical sessions. Group assignments are used to develop students' communication and collaborative skills.
- There are **three assignments worth 10% each**.
- Assignments should be submitted by the due date **at the beginning of the 9am Lecture**, otherwise penalties will be levied.

EXAMINATION Section: **<u>70 marks total</u>**

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** on **Wednesday 25 January**.
- You must take the Class Test in the tutorial class you are registered in.
- **A page of formulae and relevant statistical tables** will be attached to the Class Test.
- **A statistics calculator** should be taken into the Class Test.
- No other material 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).
- The Final Examination will be held during the examination period on **Monday 13 February** (unless notified otherwise).
- **A page of formulae and relevant statistical tables** will be attached to Final Examination.
- Students will be permitted to take **one A4 sheet, handwritten on both sides**, into the Final Examination.
- **A statistics calculator** should be taken into the Final Examination.

Students <u>must</u> perform satisfactorily in the Final Examination in order to pass the unit, regardless of their performance throughout the session.

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 must request Special Consideration for STAT170 via the Faculty of Science web page for Special Consideration Applications at
http://web.science.mq.edu.au/undergraduate_programs/current/admin_central/

You 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 session, i.e. the final day of the official examination period.

Grading in this Unit

Your final SNG and grade in STAT170 will be based on your work during the Session 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 your overall performance and the extent to which you 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)	performance which meets all unit objectives in such an exceptional way and with such marked excellence that it deserves the highest level of recognition
75 - 84	Distinction (D)	performance which clearly deserves a very high level of recognition as an excellent achievement in the unit
65 - 74	Credit (Cr)	performance which is substantially better than would normally be expected of competent students in the unit
50 - 64	Pass (P)	performance which satisfies unit objectives
0 - 49	Fail (F)	performance which does not meet unit objectives

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.

It is important to know that everyone enrolling in this unit is intellectually able to pass it. However, this requires effort and work on your part. Do not let yourself down by waiting too long to begin studying or doing the required assessments.

You can obtain constant **feedback** throughout the course, from the very first day to the end of the course, by using the resources on the CD.

Please do not hesitate to ask your lecturer, tutor, or 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:

- **Staff consultation hours**

Please contact Di Warren, unistats@netspace.net.au.

- **Administration enquiries**

For help with administrative matters, students should contact **Victoria Park**

Office: E4A 554   Telephone: 9850-8555   Email: victoria.park@mq.edu.au

- **Numeracy Centre**

The Numeracy Centre exists to help students having 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 (see Blackboard for topics and times) and an opportunity to meet with other students to discuss problems.

The Numeracy Centre will open on Thursdays from 10am-12pm from January 12.

- **CD (with the text book)**

The CD has many resources for you to learn from. In particular, it contains all the datasets for the homework problems, the quizzes, and the assignments in Minitab format. Please explore the CD immediately, as you will find that it will repay your efforts.

Computing Laboratories

The software program Minitab must be downloaded from the Statistics Department website or from Blackboard, and is installed in the computing labs in E4B. Minitab will be used in practical and tutorial sessions and for assignments. Assignments can be completed in the computing labs in E4B. You will need to bring a memory stick when using the computers in these labs.

For opening hours during Session 3, see notices outside the rooms. 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.

STAT170 Introductory Statistics - Session 3 2011

UNIT SCHEDULE

Teaching Day	Lecture topic	Text	Tutorial	Practical	Assessment Due dates
Wed 4 Jan	Introduction to Statistics	1,2,3	1	1	Buy text book (with CD) and statistical calculator.
Fri 6 Jan	Quantitative Data Understanding Distributions	4,5	2	2	
Mon 9 Jan	Standard Deviation as a ruler The Normal Model	6	3	3	
Wed 11 Jan	Gathering Data	11,12,13	4	4	
Fri 13 Jan	Probability and Sampling Distributions	18	5	5	
Mon 16 Jan	Inference Method #1: Confidence Intervals (CIs)	19,23	6	6	**Assignment1**
Wed 18 Jan	Inference Method #2: Hypothesis Tests (HT)	20,23	7	7	
Fri 20 Jan	More details about Hypothesis Tests	21	8	8	
Mon 23 Jan	Two independent samples Paired samples	24,25	9	9	**Assignment2**
Wed 25 Jan	Inferences about counts	26	10 **Class Test**	10	
Fri 27 Jan	Scatterplots, Association and Correlation Linear Regression (1)	7,8	11	11	
Mon 30 Jan	Linear Regression (2) Regression Wisdom Inference for Regression	8,9(part), 27	12	12	**Assignment3**
Wed 1 Feb	Review of STAT170		13	13	
Mon 13 Feb	**Exam**				