



Division of Economic and Financial Studies

# **STAT171: Statistical Data Analysis**

## Unit Outline

First Semester, 2008

### **Lecturers**

**Ms Suzanne Curtis**  
**Professor Graham Wood**

Read this document carefully!  
Refer to it when you have questions about the unit, before contacting your lecturer.

## ABOUT THIS UNIT

STAT171, Statistical Data Analysis, is a 3 credit point unit run by the Statistics Department in the Division of Economic and Financial Studies.

The unit is intended for students with a high level of proficiency in mathematics. The unit provides an introduction to modern statistical principles and practice with special emphasis on data analytical techniques.

The aim of the unit is to promote an understanding of the principles involved in statistical analysis and to be able to analyse simple data sets using elementary techniques. You will also be required to analyse data using the statistical package Minitab.

Students should note that STAT171 and STAT170 are equivalent pre-requisites for almost all units at Macquarie University. The exceptions are STAT272 and some actuarial units. Academic advice should be sought if a student is unable to determine which of these two introductory statistics units would best suit them.

**Actuarial students should note** that a *Credit* (not Pass) grade is needed in STAT171 as the prerequisite for ACST211 Combinatorial Probability.

## TEACHING STAFF

- Professor Graham Wood      E4A511      9850-8553  
[gwood@efs.mq.edu.au](mailto:gwood@efs.mq.edu.au)      [Lecturer-in-Charge]
- Ms Suzanne Curtis      E4A549      9850-8584  
[scurtis@efs.mq.edu.au](mailto:scurtis@efs.mq.edu.au)      [Please note that Ms Curtis is half-time]

Other staff will be involved in convening tutorials.

Consultation times for all staff will be posted on the web when details become available in the second or third week of teaching.

## CLASSES

### Lectures

You are required to attend three lectures per week (beginning in week 1), held at the following times:

Tuesday	1 – 2 pm (X5B T1)
Thursday	1 – 2 pm (X5B T1)
Friday	1 – 2 pm (X5B T1)

Lectures for weeks 1 - 9 will be convened by Ms Suzanne Curtis.

Lectures for weeks 10 - 13 will be convened by Professor Graham Wood.

A copy of the lecture notes will be made available by the beginning of each week on Blackboard prior to the topics being covered in lectures.

## Tutorials

You are required to attend one tutorial per week as allocated at enrolment. The timetable for classes can be found on the University web site at: <http://www.timetables.mq.edu.au/>.

Tutorials in STAT171 will begin in the **second** week of classes.

Attendance at tutorials forms part of the assessment for this unit – see the later assessment section.

To ensure that student numbers are equivalent in each of the tutorial groups, you may only attend the tutorial to which you have been assigned. To **change** tutorial class, you may use e-student up until the end of Week 2. After this, you must see Ms. Suzanne Curtis, but late tutorial changes will only be approved with sufficient justification.

Lists showing the allocation of students to their tutorial class will be posted on Blackboard at the beginning of Week 3. The list of tutorial allocations placed on Blackboard is the official list, and supersedes your printed timetable, as the information on e-student may become out-of-date.

**Tutorials in Week 2** will be held in the E4B computer laboratories. Room details will be posted on Blackboard in Week 1 of teaching. The exercises for this week (only) will be handed out in the class, and will involve using Minitab to analyse some data and Windows software to write a report. A report based on one of the data sets will be due at your tutorial in Week 3, and will count 2% of the 5% tutorial participation part of the assessment. Please note that any word processing software may be used to prepare the report for submission.

**Tutorials in Weeks 3 - 13** will be held in the tutorial rooms. The tutorial exercises will be available on Blackboard prior to the tutorial and will consist of four sections:

- (i) Questions for review and discussion during the tutorial - no solutions will be made available for these exercises outside tutorials. It is expected that **all** these questions will be attempted by the students *prior* to their tutorial. The work will be collected by your tutor at random throughout the semester for marking, and will count 3% towards your assessment.
- (ii) Questions denoted (\*\*) which are to be attempted *prior* to the tutorial, and will be collected by tutors at random to count in your assessment. These questions have been selected as “difficult” in order to extend the more adventurous students. Due to their nature, solutions to these questions will be gone through during the tutorial **and** placed on Blackboard.
- (iii) Selected text book and other questions which will normally **not** be discussed during the tutorial, but a fully worked solution will be made available on Blackboard at the end of each week.
- (iv) A set of recommended extra exercises from the text book, which have check answers in the back. These have been selected as useful for test and exam revision or to provide further practice at applying the techniques developed in lectures.

## REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

### Textbook

Mendenhall, William, Beaver, Robert J. and Beaver, Barbara M. (2006)  
**'Introduction to Probability and Statistics'** Twelfth edition (Duxbury Press). Six copies of the textbook are available in the Library Special Reserve.

It is expected that all students will have access to a copy of the textbook.

It is not necessary to bring the text book to tutorials or lectures.

The previous editions of the textbook have fewer exercises than the current edition, and as such are not sufficient for completing the tutorial exercises. Where possible, exercise numbers will be quoted for editions 10, 11 & 12. Older editions of the text book are available in the main section of the library:

Edition 11 (2003)	4 copies	QA276.M425/2003
Edition 10 (1999)	5 copies	QA276.M425/1999
Edition 8 (1991)	3 copies	QA276.M425/1991

### Other References (Note that many of the older editions of the listed books are also useful references)

Ryan, B.F. & Joiner, B.L., 'Minitab Handbook', (Ed 4)	QA276.4.R9/2001
Devore, Jay L. 'Probability and Statistics for Engineering and the Sciences' (Ed 4)	QA273.D46/1995
Devore, Jay L. 'Statistics: the exploration and analysis of data' (Ed 5)	QA273.D48 2005
Moore D.S. & McCabe G.P., 'Introduction to the Practice of Statistics' (Ed 5)	QA276.12.M65 2006
Griffiths D. et al, (1998) 'Understanding Data - Principles and Practice of Statistics'	QA276.G75
Mendenhall, W. & Ott, L., 'Understanding Statistics' (Ed 3)	QA276.12.M46/1980
Hamilton, Lawrence C. 'Modern Data Analysis: a first course in applied statistics'	QA276.12.H355/1990
Clarke, G.M. & Cooke D. 'A Basic Course in Statistics' (Ed 5)	QA276.12.C57 2004
Koopmans L.H., 'Introduction to Contemporary Statistical Methods', (Ed 2)	QA276.K65/1987
Chatfield, C., 'Statistics for technology: a course in applied statistics' (Ed 3)	TA340.C45/1983
Huntsberger D.V. & Billingsley, P., 'Elements of Statistical Inference', (Ed 6)	QA276.12.H86/1987

### Calculators

You will need to equip yourself with a small calculator, preferably one that does simple statistical calculations (it should have  $\bar{x}$  and  $\sigma$  on it). **You should bring it to all tutorials.** You will also need your calculator for the mid-semester test and the final examination. You will **not** be permitted to use a programmable calculator or one with a full alpha character set in any examination.

### Computing

Much use will be made of the computers located in the student laboratories in E4B. In Week 2, instruction will be provided on the use of the statistical package Minitab, as well as the Windows operating environment. After that, you will be expected to use the computers regularly without supervision. If in difficulty, you should see your tutor or a Statistics staff member during their office hours. Details of computer rooms set aside for individual student can be found at

<http://www.efs.mq.edu.au/current/ug/resources/labs> . It should be noted, however, that during the semester these rooms **may be booked by a class** – you should **check** the timetable on the door for usage availability.

The Minitab home page is <http://www.minitab.com>. Various download options are detailed here (under Minitab products for education) for home use if you prefer to not use the student labs on campus.

#### UNIT WEB RESOURCES

The unit website is [http://www.stat.mq.edu.au/ug/units/stat\\_units100/stat171](http://www.stat.mq.edu.au/ug/units/stat_units100/stat171)

The unit STAT171 will be administered from Blackboard : <https://online.mq.edu.au/> Blackboard should be consulted frequently, and will contain pages with:

- Information – STAT171 Unit Outline
- Administration – weekly announcements
- Lectures – Lecture notes (two or four per page) in pdf format for downloading
- Tutorials – Tutorial exercises (with solutions to non-discussion questions)
- Assignments – Due dates, Assignment questions, cover sheets and solutions
- Contact Information – Consultation Hours for all staff
- Links – useful links + to Minitab home page

#### ASSESSMENT

This unit will be assessed as follows :	Assignments	10 %
	Tutorials	5 %
	Mid-semester test	15 %
	Final examination	70 %

The composition of the non-examination component of the assessment is as follows:

<b>Assignments</b>		<b>Tutorials</b>	
Assignment 1	3%	Minitab report	2%
Assignment 2	3%	Tutorial exercises	3%
Assignment 3	4%		

A satisfactory performance is required in all aspects of the unit. **To pass the unit you must pass the final examination.**

#### Mid-semester test and Final Examination

The compulsory mid-semester test (of 45 minutes duration) will be held during the lecture on Thursday 10<sup>th</sup> April, in Week 7.

If you are unable to attend the test, you **must** notify either Graham Wood or Suzanne Curtis as soon as possible after the event, providing suitable documentation.

The Final Examination will be of 3 hours duration with 10 minutes reading time. All material covered in the unit is examinable.

For both the Mid-semester test and the Final examination you will be permitted to take into the exam room **one** A4 page of formulae or notes, written on one or both sides of the page. No formulae will be provided, however all necessary statistical tables will be provided.

## LEARNING OUTCOMES

The topics to be covered in STAT171 are:

1. Summarising and Displaying Data
2. Probability
3. Random variables – Discrete
4. Random variables – Continuous
5. Sampling distributions (especially the Central Limit Theorem)
6. Statistical Inference (Hypothesis Testing, Confidence Intervals, Error Types)
7. Statistical Inference ( $\sigma$  unknown) & Investigating Normality
8. Comparing Two Treatments
9. Testing Proportions
10. Regression & Correlation
11. Sample Size and Power
12. Categorical data (goodness of fit tests, independence tests, Odds ratios)

It should be noted that the order of presentation of the topics may differ from that listed here.

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop students' generic skills in a range of areas. One of the aims of this unit is that students develop their skills in the following:

*Foundation skills of literacy, numeracy and information technology;*  
*Communication skills;*  
*Problem-solving skills;*  
*Critical analysis skills.*

## TEACHING AND LEARNING STRATEGY

It is expected that a typical student will need to spend a total of 12 hours per week working on the material in STAT171. This time includes attendance at all classes, reviewing notes etc. as well as preparation of work for submission. Some students may be able to spend less time than that recommended, whilst others will need to spend substantially more time.

Lectures will be used to introduce the topics, usually with at least one worked example. Lecture notes will contain most, but **not** all, of the material from lectures. It is recommended that you review the material from the previous lecture before attending the current lecture.

Tutorial exercises are designed to encourage students to regularly review the material presented in lectures, and then to independently apply the techniques to a range of situations. Students will be encouraged to participate actively in the discussion of the appropriate methods to be applied to the problems presented.

## Assignments

Assignments are used as part of the formal assessment, but are primarily to be considered as a learning tool – to give you experience at communicating the results of your analysis in a meaningful way. Marked assignments will be available for collection at your tutorial no more than two weeks after the due date.

The assignments will be due **by 10 am** on the due date as specified in the Unit Schedule (see further on). They must be submitted via the STAT171 Assignment Box in ERIC (E4B106). Marks will be deducted for work submitted late. The assignment will not be marked unless it is accompanied by an assignment cover sheet which clearly shows your name, your tutor's name and your tutorial time and makes a declaration that the work is your own.

Assignments are to be presented on A4 paper. Some answers may be handwritten (illegible work will not be marked), other questions will need to have word-processed reports submitted. The requirements will be specified on each assignment.

### For all tutorials and assignments:

Whilst you are encouraged to discuss the work extensively with your peers, it is expected that the final material submitted will be your **own** work. Any work that is copied from another student **will** result in disciplinary action for **all** students involved. You should read the section headed "The Dangers of Plagiarism and How to Avoid It".

There is no specific word length for any section of the assessment tasks. Students should note, however, that all real-world problems need to be properly answered. Answers should include definitions of any variables used, the specific hypotheses being tested, a brief rationale for the analysing technique and a meaningful conclusion.

### Test

The class test should encourage you to consolidate your understanding of the unit material, prior to moving on to the later topics. The test should also give you experience in demonstrating your knowledge in preparation for the final examination.

**Class tests and assignments are compulsory, and any student who does not complete these may be excluded from the unit under Bachelor Degree regulation 11(1).**

If illness or misadventure prevents you from completing an assessment task during the semester, you should contact Graham Wood or Suzanne Curtis as soon as possible, and submit your documentation with the "Advice of Absence or Other Circumstances" form to the Student Centre *as soon as possible and no later than the last teaching day of semester*. This form is available from <http://www.reg.mq.edu.au/Forms/USSAbsence.pdf>

## Examination

The final examination will include any material covered throughout the unit.

The University Examination period in First Half Year 2008 is from 11<sup>th</sup> June to 27<sup>th</sup> June.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable <http://www.timetables.mq.edu.au/exam>

The only exception to sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at <http://www.reg.mq.edu.au/Forms/APSCon.pdf>

Note that there is a Division policy regarding requests for special consideration for examinations and the granting of supplementary examinations on the website: [http://www.efs.mq.edu.au/services/policies\\_consideration.htm](http://www.efs.mq.edu.au/services/policies_consideration.htm). Please be aware that you will not be contacted to be advised that you have been granted a supplementary examination – you will need to consult the website for this information.

## PLAGIARISM

The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found in the *Handbook of Undergraduate Studies* or on the web at: <http://www.student.mq.edu.au/plagiarism/>

## UNIVERSITY POLICY ON GRADING

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include one of these grades plus a standardised numerical grade (SNG).

On occasion your raw mark for a unit (i.e. the total of your marks for each assessment item) may not be the same as the SNG which you receive. Under the Senate guidelines, results may be scaled to ensure that there is a degree of comparability across the university, so that units with the same past performances of their students should achieve similar results.

For an explanation of the policy see <http://www.mq.edu.au/senate/MQUonly/Issues/Guidelines2003.doc> or <http://www.mq.edu.au/senate/MQUonly/Issues/detailedguidelines.doc>.

## 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>.

The Division of Economic and Financial Services has student support located in ERIC (Economic Reference and Information Centre) – E4B106.

# STAT171 – First Semester, 2008

## Unit Schedule

Week	Begins	Work Due	Details	Value
1	25 Feb			
2	3 Mar	Maths Quiz	In tutorials	
3	10 Mar	Minitab report	In tutorials	2%
4	17 Mar			
Note: Public Holidays (Easter Friday and Monday, 21 and 24 March)				
5	25 Mar	Assignment 1	ERIC: 10 am Tues 25 March	3%
6	31 Mar			
7	7 Apr	Mid-semester Test	In lecture on Thurs 10 April	15%
<b>BREAK Two weeks</b>				
8	28 Apr			
9	5 May	Assignment 2	ERIC: 10 am Tues 6 May	3%
10	12 May			
11	19 May			
12	26 May	Assignment 3	ERIC: 10 am Tues 27 May	4%
13	2 Jun			

Tutorial exercises will be collected at random throughout the semester. They will count 3% towards your overall assessment.

The final examination counts 70% of your assessment. You must pass the final examination to pass the unit.