



Division of Economic and Financial Studies

Stat270: Applied Statistics

Unit Outline First Semester 2006

Unit Convenor: Sue Crowe

Read this document carefully! Refer to it when you have questions about the unit, before contacting your lecturer. Also refer to the Stat270 web page, which contains up to date information and announcements.

ABOUT THIS UNIT

Stat270, Applied Statistics, is a 3 credit point unit run by the Statistics Department in the Division of Economic and Financial Studies.

This unit aims to extend and broaden the statistical experience you have gained in your first 100 level statistics unit. Topics covered will include statistical inference, data handling, one way and two way analysis of variance and simple and multiple regression.

Stat270 is a core unit in the Statistics program. Together with Stat273, Risk and Chance, this unit leads on to 300 level units such as Stat302, Data Mining and Graphics; Stat320, Modelling and Quality Management; Stat328, Market Research and Forecasting; Stat373, Design of Surveys and Experiments; and Stat395, Biostatistics and Epidemiology.

Prerequisites: The prerequisites for this unit are *STAT170 (P) or STAT171(P); STAT172 (P) or STAT175(P) or GPA > 1.5*. Students are expected to be familiar with the material covered in these prerequisites.

TEACHING STAFF

Convenor: Ms Sue Crowe, E4A539, phone 9850 8560 email: scrowe@efs.mq.edu.au

Please note that any communication with staff via email will only be conducted using your official university email address. The details of other teaching staff and times for consultation hours will be finalised at the end of Week 1. These will be posted on the web site.

If your question relates to the unit materials (i.e. not a personal administrative one) you are encouraged to use the Stat270 Discussion forum under WebCT.

CLASSES

Times and locations for all classes can be found on the University web site at: www.timetables.mq.edu.au

Lectures: You are required to attend 3 x 1 hour lectures each week, beginning in Week 1.

Tutorials: You are required to attend 1 x 1 hour tutorial each week, beginning in Week 2. Attendance at tutorials forms part of the assessment for this unit - see the later assessment section.

You will have been assigned to a tutorial at enrolment. To ensure that students numbers are equivalent in each of the tutorial groups, you may only attend the tutorial to which you have been assigned. Lists of tutorial allocations will be placed on the web at the end of week one. You may only change tutorials by using e-student (navigate from the Macquarie home page, or the student portal <https://my.mq.edu.au> or <https://student1.mq.edu.au/t1tbmain.asp>). A useful link for information about changing your program is <http://www.reg.mq.edu.au/Undergrad/currentstudents/currentstudents/cop.htm>.

The Ho Kam-chiu Prize in Statistics

The prize is open to all students taking at least 9 credit points in 200-level and/or 300-level Statistics units in one academic year. The prize will be awarded to the student in this category with the highest average SNG in all Statistics units taken at 200 and 300 level in the particular year. A student may be awarded the prize more than once if he/she continues to be the best student in successive years of study.

UNIT WEB PAGE/S

Navigate from www.stat.mq.edu.au/Units/stat270/index.htm and <http://online.mq.edu.au/>

This unit will have a Discussions forum, iLectures and other material available online through the University's Online Teaching Facility, WebCT. A link will be available through the Stat270 web page, as well as from online.mq.edu.au. Use your student ID number and your myMQ Student Portal Password to access the site. Consult the web page and Discussions forum frequently (at least once a week). Useful guides on using the Online Teaching Facility are also available at this site.

REQUIRED AND RECOMMENDED TEXTS

PRESCRIBED TEXTBOOK: Moore, D.S. and McCabe, G. P.(2006) **Introduction to the Practice of Statistics**, Fifth Edition (W.H. Freeman) is the set text for this unit. This book is available in the Coop Bookshop. The publishers of this text also maintain a web site, on which you will find many useful extra features, such as copies of the tables, quizzes, etc <http://bcs.whfreeman.com/ips5e/>

PRESCRIBED UNIT MATERIALS: The Course Notes for Stat270, available in the Coop Bookshop, contain copies of the lecture slides. A master copy of these materials is also available in Reserve.

ADDITIONAL REFERENCES: These are available in Reserve.

De Veaux, R.D., Velleman, P.F. and Bock, D.E. **Stats Data and Models** (Pearson) *HIGHLY RECOMMENDED*

Anderson, J. and Poole, M. (1994) **Thesis and Assignment Writing** (Wiley)

Chatterjee, S. Hadi, A. and Price, B. (2000) **Regression Analysis By Example** (Wiley)

Devore, J. and Peck, R (2005) **Statistics The Exploration and Analysis of Data** (Brooks/Cole)

Ott, R. L. (1993) **An Introduction to Statistical Methods and Data Analysis** (Wadsworth)

Ramsay, F.L. and Schafer, D.W. (2002) **The Statistical Sleuth** (Wadsworth)

Ryan, B.F. and Joiner, B.L. (1994) **Minitab Handbook**, Third Edition (Duxbury Press)

Utts, J.M. and Heckard, R. F. (2004) **Mind on Statistics**, (Duxbury Press)

Utts, J.M. and Heckard, R. F. (2006) **Statistical Ideas and Methods**, (Duxbury Press)

CALCULATORS An electronic calculator is essential and will be required for the final examination. Only non text returnable calculators are permitted in tests and examinations.

COMPUTING You will be expected to use ACCESS for data handling and MINITAB to perform data analyses. We will have some supervised lab sessions during tutorials, and you can use the software in the C5C labs when they are not booked for classes. You can find more information on Minitab at their web site: <http://www.minitab.com> . This includes a link to e-academy, for short term rental of the software.

LEARNING OUTCOMES

By the end of Stat270, students should

- be able to produce and interpret appropriate visual displays and numerical summaries to explore data
- understand the importance of data organisation
- be able to decide on the appropriate statistical model for a research question and data set
- be able to decide on the appropriate statistical analysis to be used in given situations
- be able to apply and interpret the statistical methods covered in Stat270 to explore data and provide answers to research questions
- to understand the assumptions underlying the models and methods covered in Stat270

continued over

- to be able to judge whether or not it is reasonable to make the assumption/s underlying a statistical analysis
- to have improved their problem solving ability
- to have improved their report writing skills
- to have improved their ability to independently use statistical software, and to integrate this with the use of other software

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
- Critical analysis skills
- Problem-solving skills

TEACHING AND LEARNING STRATEGY

Students in Stat270 will attend 3 x 1 hour lectures and 1x 1 hour tutorial. A week by week list of the topics to be covered in Stat270 is given at the end of this document.

Lectures: The Course Notes for Stat270, available in the Coop Bookshop, contain copies of the lecture slides. It is recommended that you review the previous week's lecture material before attending the current week's classes. The summaries given for each module of the lecture material will give you guidance about the learning objectives for that specific module, as well as suggestions for additional exercises which will reinforce the concepts in that module. A copy of these notes is also available in Reserve.

Tutorials: The format of tutorials will vary from week to week. While most tutorials will be held in your designated classroom, in some weeks they will be held in the computing labs in E4B. The main handout for tutorials is given out in the first tutorial. Tutorial material does not have to be prepared in advance, but it is recommended that you review the previous week's work before attending the current week's tutorial.

Independent Work: In Stat270 you are also expected to spend some time each week working on your own. This may include revision of lecture and tutorial material, attempts at extra examples (from lectures, your textbook or other text books) and completion of homework tasks and assignments.

At Macquarie University it is expected that the average student would spend approximately 3 - 4 hours per week for each credit point in a unit. This means that for Stat270 you should expect to spend approximately 12 hours per week in both formal classes and independent work.

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

This unit will be assessed as follows:

1.	Assignments	8%
2.	Class Tests	12%
3.	Tutorial Homework and Participation	10%
4.	Final Examination	70%

General Information about in-semester assessment tasks Solutions to most of the in semester assessment tasks these will be posted on the appropriate Stat270 web page so that you can get prompt feedback. You should seek help with any problems with this material as soon as possible.

Assignments and homework tasks will be handed out in lectures, and must be submitted with their cover sheet via the Stat270 assignment box in ERIC (E4B106). Due dates and times will be specified on the handout. Copies of these tasks will also be posted on the web.

Tutorials and Homework Tasks The Tutorial Homework and Participation mark will be made up of two components. Attendance will contribute 4% and a mark for completion of homework tasks will contribute 6%. Homework tasks will be set from week to week, as listed in the unit timetable at the end of this document. They will generally be handed out one week before they are due. Homework tasks will be given marks from 0 to 3. Any homework submitted more than 1 day after the due day and time will not be marked, unless documented evidence of illness or misadventure is provided. Any homework submitted late, but within 24 hours of the deadline, will be penalised by 1 mark out of 3. This component of the assessment is to encourage you to practice the techniques covered in lectures.

Assignments There will be two assignments worth 4% each. The weeks in which the assignments are due are given in the unit timetable at the end of this document. While assignments will involve the practical application of the techniques covered in lectures, their main aim is to give you experience at communicating the results of your analysis in a meaningful way. Assignments will generally be handed out two weeks before they are due. Marked assignments will be available for collection at your tutorial 2 weeks after the due date. A model solution will be posted on the web at this time.

Any assignment submitted more than 1 day after the due day and time will not be marked, unless documented evidence of illness or misadventure is provided. Any assignment submitted late, but within 24 hours of the deadline, will be penalised by 2 marks out of 10.

Class Tests There will be two class tests held during lecture time in the weeks specified in the unit timetable. The exact lecture time at which they will be held will be specified in lectures two weeks prior to the test. Students may bring into the tests **one** A4 sheet, which may have material *handwritten* on both sides. Information about the content and layout of the tests will be given in lectures.

Class tests should encourage you to consolidate your understanding of the unit material, before moving on to the later modules. They should also give you experience in demonstrating your knowledge, in preparation for the final examination. They will be returned in tutorials the week after you have completed them, and solutions will be available on the web after that.

In cases where a test is missed due to illness or misadventure, no make up test will be given. Your overall assessment mark will be adjusted at the end of the unit.

Illness or Misadventure If illness or misadventure prevents you from completing an assessment task *during semester* you should contact Sue Crowe 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>

Final Examination This will examine any material covered throughout the unit. Students may bring into the examination **two** A4 sheets, which may have material *handwritten* on both sides.

Students must perform satisfactorily in both the final examination and the other assessment tasks in order to pass the unit.

The University Examination period for First Half Year 2006 is from 14 to 30 June.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The 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 - refer to <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 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/APSCons.pdf> . Please note that this form and the appropriate documentation must be submitted *before the end* of the examination period.

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 . 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.

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 semester, that is the final day of the official examination period.

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/>

The policies and procedures explain what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

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.

It is important that you realise that the policy does not require that a minimum number of students are to be failed in any unit. In fact it does something like the opposite, in requiring examiners to explain their actions if more than 20% of students fail in a unit.

The process of scaling does not change the order of marks among students. A student who receives a higher raw mark than another will also receive a higher final scaled mark.

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>

Grading in Stat270

Your final grade in Stat270 will be based on your work during semester and in the final examination, as specified in the Assessment section above. The grades allocated are as set out in the Bachelor Degree Rules 10 (2), as follows:

<i>HD</i>	<i>High Distinction</i>	denotes performance which meets all unit objectives in such an exceptional way and with such marked excellence that it deserves the highest level of recognition
<i>D</i>	<i>Distinction</i>	denotes performance which clearly deserves a very high level of recognition as an excellent achievement in the unit
<i>CR</i>	<i>Credit</i>	denotes performance which is substantially better than would normally be expected of competent students in the unit
<i>P</i>	<i>Pass</i>	denotes performance which satisfies unit objectives
<i>PC</i>	<i>Conceded Pass</i>	denotes performance which meets unit objectives only marginally
<i>F</i>	<i>Fail</i>	denotes performance which does not meet unit objectives

Once your grade has been decided, you are given a *Standardised Numerical Grade*, SNG. SNGs are not marks but are a ranking of students based on marks obtained from all facets of the unit assessment.

The SNGs awarded in a particular unit are designed to indicate that the students in each performance band, from HD to PC, have satisfied the criteria for inclusion in that band and ranks them by their performance within that band. Since the ranges of SNGs differ from band to band the relationship between raw marks and SNGs may differ from band to band even within the same unit. The relationship between raw marks and SNGs would almost always differ between units.

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>.

Other information for Macquarie students is available from the Student Portal <https://my.mq.edu.au>. This includes access to your official university email.

IT help is available from the IT help desk in the library, and from <http://www.lib.mq.edu.au/help/>

Help with Stat270: During lectures in Week 1 we will discuss some 'helpful hints' for Stat270 - consult the copy of this document on the web page. It is recommended that you check the Stat270 web page regularly, as this contains the most up to date information about the unit. Of course it is also recommended that you attend lectures and tutorials, as these will also give you up to date information! Many of the assessment tasks will have solutions available from the web site.

We recommend that you seek help with the Stat270 material sooner rather than later by seeing a staff member in consultation hours. For administrative queries, please contact Sue Crowe. For assistance with the material in Stat270, we recommend that you use the Discussions Forum, and consult the lecturer and tutors during their consultation hours ('Office Hours'), or at other times by appointment. A list of the contact details and consultation times for Stat270 will be available from the Stat270 web page.

The Numeracy Centre (C5A 225) may also be able to offer assistance.

**STAT270 First Semester, 2006
UNIT Timetable**

Note: this is intended as an *approximate* guide to the timing of the topics in this unit. This timing may vary - check the administrative notes on the web page regularly for updated information. Information about due dates, times, etc. will be listed on the handout for the relevant task.

Week (Begins)	Lecture	Work due
1 (27 Feb)	Introduction, Module 1.1: Review of Inference, Confidence Intervals Text: 1.2, 1.3, 6.1, 6.2, 7.1, 7.2	
2 (6 Mar)	Module 1.2: Assumptions, Transformations Text: 1.3, 7.1, 7.2, 7.3	
3 (13 Mar)	Module 1.3: Type I and II errors, Power Text: 6.4	HW3
4 (20 Mar)	Module 1.4: Data Handling, Module 2.1: Introduction to One way ANOVA Text: 12.1	HW4
5 (27 Mar)	Module 2.1: One way ANOVA	Test 1
6 (3 Apr)	Module 2.2: One-way ANOVA - Multiple Comparisons Text: 12.2	
7 (10 Apr)	Module 3.1: Simple Linear regression Text: Chapter 2, 10	Assignment 1
<p>**** Midsemester Break - two weeks **** **** <i>Note: Friday 14 April is a Public Holiday</i> ****</p>		
8 (1 May)	Module 3.1: Simple Linear regression and transformations	HW8
9 (8 May)	Module 3.2: Introduction to Multiple Regression Text: Chapter 11	HW9
10 (15 May)	Module 3.2: Introduction to Multiple Regression	Test2
11 (22 May)	Module 4.1: Two-way ANOVA Text: Chapter 13	
12 (29 May)	Module 4.2: Two-way ANOVA - multiple comparisons	Assignment 2
13 (5 Jun)	Revision	