MACQUARIE UNIVERSITY
DIVISION OF ECONOMICS AND FINANCIAL STUDIES
STAT271: STATISTICS
UNIT OUTLINE

Year and Semester: Second semester, 2006
Lecturer-in-charge: Prof Barry Quinn
Prerequisites / Corequisites: STAT272 (P)

Students in this unit should read this unit outline carefully at the start 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

This is a 3 credit-point unit. This unit studies basic issues of statistics. Techniques discussed in this unit are absolutely necessary for modern statistical data analysis.

TEACHING STAFF

Prof Barry Quinn (weeks 1 – 4)
    Room: E4A511. Telephone: (02) 9850-6475. Fax: (02) 9850-7669
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    Consulting hours: Tuesday 5pm, Wednesday 12pm.

Dr Frederick Wong (weeks 5 – 8)
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Ms Suzanne Curtis (weeks 9 – 13)
    Room: E4A549. Telephone: (02) 9850-8584. Fax: (02) 9850-7669
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    Consulting hours: Thursday 11am.

CLASSES

Lectures
There are three lectures per week; the times are as stated in the timetable:

Monday	2.00 pm	C5C T1
Wednesday	11.00 am	W5A Price
Thursday	10.00 am	C5C T2

Tutorials
Students are expected to attend one tutorial per week, commencing in the second week of lectures. Until Thursday of week 1 (3rd August), tutorial changes may be done at any of the change-of-program sessions, or using the University administered web facility. Otherwise students should contact the lecturer.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Students are expected to have access to a copy of the prescribed text book throughout the semester. Copies of the text book and student solution manual are held in Special Reserve in the University Library.

> Mendenhall W, Wackerly D and Scheaffer R.   QA276.M426_2000
> "Mathematical Statistics with Applications", Sixth Edition

The Library also holds copies of the Fifth Edition of the text book (QA276.M426/1996) and the Student solutions manual by Charles D. Kincaid.

UNIT WEB PAGE

The unit web page is available at the following address:
http://www.stat.mq.edu.au/units/stat271/index.htm

LEARNING OUTCOMES

Our aim in this unit is: To familiarize you with the modern concepts and procedures of statistical analysis, especially *parametric estimation, hypothesis testing, ANOVA and regression.*

In addition, we also emphasise the following generic skills in this unit, namely

- *Problem-solving skills;*
- *Creative thinking skills.*

TEACHING AND LEARNING STRATEGY

This unit are taught by lectures and tutorials. Students are required to attend lecturers and tutorials.

	TOPICS
1	Point estimation methods, including the method of moments and maximum likelihood. Properties of estimators. Asymptotic (large sample) properties.
2	Sampling distributions and properties of sample statistics. Definition and derivation of t, F and χ^2 distributions.
3	Interval estimation. Confidence intervals.
4	Principles of hypothesis testing. Type I & II errors. Power. Comparison of competing tests. Relationship between confidence intervals and hypothesis testing.
5	Confidence intervals and hypothesis testing for the probability parameter in the binomial distribution.
6	Confidence intervals and hypothesis testing in the single-sample case, including related samples (paired comparisons). Both classical (normal theory) and nonparametric tests are considered.
7	Confidence intervals and hypothesis testing in the two-sample case, including the test for equality of variances. Both classical (normal theory) and nonparametric tests are considered.
8	χ^2 tests. Both goodness of fit tests and tests of association are covered.
9	One-way analysis of variance – the generalisation of two-sample problems to more than two samples. Both classical (normal theory) and nonparametric tests are covered.
10	Two-way analysis of variance. Contrasts. Multiple comparisons. Both classical (normal theory) and nonparametric tests are covered.
11	Simple linear regression. Multiple linear regression, including polynomial curve fitting. R^2 and its interpretation.

Lecture notes will usually be available at the unit web page, before the lecture. Students should read the lecture notes before the lecture. The assignment and lecture notes pages are password-protected. The userid and password will be given at the first lecture.

ASSESSMENT

Grades awarded to students will be based on their performance in the assignments and examination. Assessment will be on the following basis:

Assignments   **20%**

Final examination   **80%**

In order to pass the unit you must demonstrate satisfactory performances in **all** aspects of assessment.

Assignments

Assignments are a major part of the learning process. There will be four assignments, which are to be submitted to your tutor in the tutorials in weeks 3, 6, 9 and 12 (note that all tutorials are on Monday). Assignments are compulsory. Failure to submit assignments on time may result in automatic exclusion from the unit in accordance with Bachelor Degree Rule 10(1).

Assignments must be each student's own work. Discussions are allowed but the final work must be your personal effort.

Final Examination

A non-programmable calculator and one A4 sheet of notes (must be handwritten and possibly on both sides) may be taken in to the examination room. The final examination will cover all the materials discussed in this unit.

The University Examination period in the Second Half Year 2006 is from November 15 2006 to December 1 2006.

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.
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/APSCon.pdf

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.

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, which 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.

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.

REFERENCES

The following books are useful references for this unit.

Bain, L.J. & Engelhardt, M.   Introduction to Probability and Mathematical Statistics
                             QA273.B2546 / 1992

Conover, W.J.   Practical Nonparametric Statistics
                             QA278.8.C65 / 1999

Hogg, R.V. & Craig, A.T.   Introduction to Mathematical Statistics
                             QA276.H59 / 1995

Larson, H.J.   Introduction to Probability Theory and Statistical Inference
                             QA273.L352 / 1982

Walpole, R.E. & Myers, R.H. Probability and Statistics for Engineers and Scientists
                             TA340.W35 / 1993