STAT 170
Introductory Statistics

UNIT OUTLINE

Trimester 2, 2006

STATEMENT OF PURPOSE

Stat170 provides a broad introduction to statistical practice and data analysis techniques. It aims to equip the student with a basic understanding of statistics. The techniques learnt are widely used in the sciences, social sciences, business and many other fields of study. Topics covered include study design, data manipulation, statistical inference, simple regression and analysis of categorical data.

LEARNING OUTCOMES

By the end of the unit, students should be able to:
- organise and summarise data graphically and numerically
- analyse straightforward datasets using appropriate techniques
- draw conclusions from the results of data analysis.

GENERIC SKILLS

University study aims, not only to provide students with knowledge and skills in a particular academic discipline, but also to equip them with some generic skills. By the end of this unit students should:

- be able to manipulate and analyse data using Excel and the statistical package EcStat

- have enhanced their problem solving ability

- have improved their written communication skills, particularly report writing skills

- be confident in the use of the Internet for obtaining information and communicating with others in Online Discussions

- have developed their ability to work co-operatively as team members

- have learnt to be sceptical of claims that are not supported by well designed studies.

VOCATIONAL OUTCOMES

A basic understanding of statistics is fundamental to all the sciences and social sciences. To deal with the enormous amount of information delivered in the modern environment it is essential to develop an ability to draw conclusions from data analysis and to be able to report these conclusions. In turn, it is also important to be able to critically evaluate statistical results presented by others in research reports, in the workplace and especially in the media.

There are many opportunities for students who major in statistics. Areas include medical research, business analysis, insurance and various government departments. Students who major in other areas will also find a knowledge of statistics a valuable skill in the workplace.

SPECIALIST SKILLS or KNOWLEDGE

Use is made of a statistical computer package for handling and analysing data and a word processor for reporting results. However, no prior computing knowledge is assumed.

CORE or ELECTIVE UNITS, PREREQUISITES and COREQUISITES

Stat170 is a core unit for a large number of degrees offered at Macquarie University. These include BEc, BCom, BBA and is recommended in many others.
There are neither pre-requisites nor co-requisites for Stat170.

WORKLOAD

Lectures

Lectures begin in Week 1. Students should attend ONE 3-hour session per week. The Study Guides package should be brought to lectures each week as it contains copies of the lecture slides.

Tutorials

Tutorials begin in Week 1. The aim of tutorials is to practise techniques learnt in lectures. They are designed so that students 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.

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 a computer, the statistical package EcStat and the techniques learnt during lectures to help solve statistical problems.

Non-Contact Hours

While attendance at classes is important it is only a small proportion of the total workload for the unit. Reading, research in the library, working with other students in groups, completing assignments, using the computer and private study are all part of the work involved. At Macquarie it is expected that the average student should spend four hours per week per credit point. A typical Stat170 student should, therefore, expect to spend at least seven hours per week on independent work.

SPECIALIST FACILITIES or EQUIPMENT

Computing

The Excel Add-in, EcStat, which is included on the CDRom will be used in practical sessions and for assignments. Computers with EcStat are available in the SIBT computing laboratories. Assignments, GNATs and WASPs can be completed in these rooms. You will need to bring a floppy disk when using these computers. GNATs and WASPs can be completed on any PC that has access to the Internet. Computers in the library also have Internet access.

Web Address

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

1. From this site you can access the Stat170 Home page by clicking Stat170. General information relating to Stat170 is available here. From here, select the SIBT offering of the unit which has information relevant to this offering. This includes Login to the GNATs and WASPs.

2. Alternatively, the URL to access Gnats & Wasps directly is
   http://online.mq.edu.au/SCRIPT/STAT170S/scripts/serve_home

Calculators

A calculator with statistical mode is essential. You are advised to bring your calculator to lectures, practicals and tutorials. You will also need it for the class test and the final examination. Text-returnable calculators cannot be used in the class test or the final examination.

HELP WITH STAT170

Extra help is available for students enrolled in Stat170. In particular, if you are having problems with the content of the unit you can seek help from the following avenues:

Numeracy Centre

The Numeracy Centre was set up in 1989 to help students having difficulties with numeracy based subjects. Any student who lacks the knowledge of mathematics needed for Stat170 is encouraged to seek the help of the Centre. The centre is located in C5A 225. The Centre offers a number of services including individual help, supplementary workshops and an opportunity to meet with other students to discuss problems.

CDRom

The CDRom has a learning package which includes lectures quizzes and examples. The CDRom lecture material includes different examples to those presented in lectures and thus provides a further opportunity to work through the course material. The quizzes and examples accompanying these help to test your knowledge of the material covered.

Audiovisual program

The *Against all Odds* series provides an additional explanation of the material. This video series is available in the audio-visual section in the Library. Individuals or groups may view these in the cubicles or viewing rooms provided and arrangements to do so should be made with the audio-visual section of the library. You will need your student ID card to borrow these videos.

ASSESSMENT

Coursework

Assignments	15%	
GNATS	10%	
WASPS	5%	
	30%	

Examinations

Class Test	15%	(or not counted)
Final Examination	55%	(or 70% if Class Test not counted)
	70%	

> If you gain **less than 15** marks in the coursework, the highest grade you can receive is a **P.**
> If you gain **less than 10** marks in the coursework, the highest grade you can receive is a **PC.**
> Note that **you must pass the <u>final</u> examination** in order to pass the unit.

Your final mark will be made up of a combination of the Coursework and the Examinations. Your Examination mark will be calculated as the better of your Class Test mark (out of 15) plus the Final Examination mark (out of 55) OR your Final Examination mark only (out of 70).

Supplementary Examination

Note that, the offer of a supplementary examination is available only to those students who have performed satisfactorily in the formative assessment section of the unit. A mark of 15/30 or higher is considered satisfactory.

PART A

Coursework (30): If you gain less than 15 marks in the coursework, the highest grade you can receive is a P. If you gain less than 10 marks in the coursework, the highest grade you can receive is a PC.

Part A of the assessment is primarily designed to aid your learning during the semester and is a compulsory part of the unit. The unit schedule includes due dates for the assessment components.

General Network Assessed Tests (GNATs)   10 marks

Nine General Network Assessed Tests (GNATs) should be completed, in your own time, in the computer rooms, or on any PC that is connected to the Internet. This material is designed to give you practice in the mechanical aspects of statistics. GNAT7 is designed for revision. It is worth 2 marks. All other tests are worth 1 mark. You are allowed two attempts at each GNAT and the higher mark of the two will be recorded. To determine which browsers are supported by WebCT go to http://online.mq.edu.au/uw/software.html. Please note that other important information regarding GNATs is outlined in the GNATs document (green) in the Stat170 Study Guides.

WEB Assessment using a Statistical Package (WASPs)   5 marks

In practical sessions you will work through the beige worksheets provided in the Study Guides package. These have spaces to write in your answers to the questions and exercises. These answers need to be transferred to WASPs on the Internet and will be assessed there. Each of these tests is worth ½ mark. Questions should be answered carefully as there is only one attempt allowed at each WASP. Information on how to access WASPs is given in Practical 0.

Assignments   15 marks

There are three assignments. Each should be submitted in your tutorial class in the week in which it is due. Assignments are to be submitted on the answer sheets provided or as word-processed documents where indicated. They give you an opportunity to develop good statistical practice and to reinforce and apply the concepts covered in lectures and the skills learned in practical sessions. Assignments must be submitted as a group, where a group should consist of three students enrolled in the same tutorial class. It is important that each member of the group contribute equally to the assignment. Each student should attempt all the problems. The group should then meet to discuss everyone's ideas and a final solution written up. Marks allocated to that assignment will be awarded to each student in the group. There should be no plagiarism or collusion between groups. You should refer to the University Policy on Plagiarism: http://www.student.mq.edu.au/plagiarism/

PART B

Final Examination & Class Test   70 marks

The class test will be held in your tutorial in Week 10. It will cover all material up to and including Lecture 8. Note: you must sit the test during your allocated tutorial.

Text-returnable calculators are not permitted in the class test or the final examination. A page of formulae, used throughout the unit, will be attached to both the class test and the final examination.

The final examination will be held during the examination period. Students will be permitted to take one A4 sheet, handwritten on both sides, into the final examination. This sheet must be returned with the examination paper at the end of the exam. Students MUST perform satisfactorily in the final examination in order to pass the unit, regardless of their performance throughout the semester.

Note that your mark for this section of the unit will be calculated as the better of either your class test (15%) plus the examination (55%) OR as the examination only, in which case it is worth 70%.

GRADING

Your final grade will be based on both the formative assessment section of the unit and the examination section. In order to attain a particular grade in the unit, the requirement for that grade must be met in both of these sections. The grades allocated are as set out in the Bachelor Degree Rules 10 (2), page 92.

http://www.cal.mq.edu.au/PDFs/2005/ug-bachelor-degree-rules.pdf

Once your final grade has been decided you will be awarded a standardised numerical grade (SNG). SNG's are not marks but are a ranking of students based on marks obtained from all facets of the unit assessment.

The SNG's 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 SNG's differ from band to band the relationship between raw marks and SNG's may differ from band to band even within the same unit. The relationship between raw marks and SNG's would almost always differ between units.

PLAGIARISM AND COLLUSION

Plagiarism and/or copying are regarded as serious academic misconduct. Students who are found to be plagiarising work from another source will have a fail grade recorded for their work. These students will also be required to explain their action to the Academic Director. The matter will then be referred to the Academic Committee and further action will be taken as appropriate.

TEXTS AND OTHER REFERENCE MATERIAL

Students will need to purchase, from the Co-op Bookshop, a copy of:

- Stat170 Introductory Statistics Study Guides (includes a compact disc)
- Modern Statistics: A Graphical Introduction by McNeil et al   QA276.M22

The CDRom includes the following materials:

- a learning package containing lecture material with examples and quizzes.
- a copy of EcStat, an add-in to Excel
- some data files needed for this unit.

Suggested additional material:

STATPAC - An audio-visual tutorial package is available at the Co-op bookshop.

The following texts are recommended reading:

- Statistics without Tears by Rowntree (Penguin)   QA276.R66
- The Basic Practice of Statistics by Moore (W.H. Freeman, 2000) QA276.12.M648
- Mind on Statistics by Utts & Heckard (Duxbury, 2002)   QA276.12.UT8

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UNIT SCHEDULE

WEEK	LECTURE TOPIC	TEXT Chapter	Assessment Due (*Note that all Gnats and Wasps are due by 10pm*)
26 June W1	Introduction Study Design Simple Displays	1, 2	Obtain Study Guides and Text Book from Bookshop.
3 July W2	Graphical Displays of continuous data	2	DEMO GNAT: 3/7 – 2/10 DEMO WASP: 3/7 – 2/10
10 July W3	Numerical Summaries & Distributions	3, 4	GNAT 1: 10/7 – 23/7 WASP 1: 10/7 – 21/7
17 July W4	Normal Distribution	4	GNAT 2: 17/7 – 30/7 WASP 2: 17/7 – 28/7
24 July W5	Sampling	5	GNAT 3: 24/7 – 6/8 WASP 3: 24/7 – 4/8
31 July W6	Confidence Intervals	6	GNAT 4: 31/7 – 13/8 WASP 4: 31/7 – 11/8 **Assignment 1 due**
7 August W7	Hypothesis Tests	7	GNAT 5: 7/8 – 27/8 WASP 5: 7/8 – 25/8
14 August W8	Comparisons: Two-sample Tests	8	GNAT 6: 14/8 -3/9 GNAT 7: 14/8 -10/9 WASP 6: 14/8 -2/9
SEMESTER BREAK: 21 August – 24 August *Note: Make-up classes for 29th September held on 25th August*			
28 August W9	Examining Relations	9	WASP 7: 28/8 – 8/9 **Assignment 2 due**
4 September W10	Testing and Assessing Relations	9	GNAT 8: 4/9 – 17/9 WASP 8: 4/9 – 15/9 **CLASS TEST**
11 September W11	Categorical Data Analysis Hypothesis Tests	10	GNAT 9: 11/9 – 24/9 WASP 9: 11/9 –22/9
18 September W12	Categorical Data Analysis Odds ratios	10	WASP 10: 18/9 – 29/9 **Assignment 3 due**
25 September W13	Unit Summary		

After completing a quiz you must View Results in order that your quiz is graded. If any of your quizzes appears as UNGRADED *then you should select View Scores for Quizzes from the Gnats and Wasps page and press Go. Click on the attempt that has not been graded and when you return to Scores your quiz will have been graded.*

Due dates for Gnats and Wasps: Note that you have at least 11 days to complete each quiz. You should complete these early, particularly your first attempt at each Gnat. If left until the last day then you may find that you have access problems and will lose the marks for that quiz.