



STAT170 – Introductory Statistics

Full Year 2009

Unit Outline

Unit Convener: Hilary Green

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

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 either semester, externally in first semester, or as a full year unit. There are no prerequisites or co-requisites for this unit.

Stat170 is a prerequisite for all 200 and 300 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 core unit for a number of courses at Macquarie University.

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 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, regression and analysis of categorical data.

Teaching Staff

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Classes

Students should attend the following classes each week:

- 1 x 2 hour lecture beginning in Week 1
- 1 x 1 hour practical and 1 x 1 hour tutorial in alternate weeks beginning with a practical in Week 2

The timetable for classes can be found on the University web site at:

<http://www.timetables.mq.edu.au>

Students can change their tutorial and practical classes by using eStudent at:

<https://student1.mq.edu.au/t1tbmain.asp>

Text books and other reference material

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

- Stat170 Introductory Statistics Study Guide 2009 (includes a compact disc)
- Modern Statistics: A Graphical Introduction by McNeil et al QA276.M22

A calculator with statistical mode 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)
- 📖 Intro Stats by De Veaux, Velleman and Bock (Addison Wesley, 2006)
- 📖 Statistics: The Art & Science of Learning from Data by Agresti & Franklin (Prentice Hall, 2007)
- 📖 Elementary Statistics by Triola (Addison Wesley, 2007)
- 📖 The Statistical Sleuth by Ramsey and Schafer (Duxbury, 2002)
- 📖 Intro Stats by De Veaux, Velleman and Bock (Pearson, 2006)

Don McNeil Prize for Introductory Statistics

This prize is named in honour of the foundation Professor of Statistics who has had an enormous impact on the teaching of first year statistics at Macquarie University. The prize of \$1000 is awarded each semester to the student with the best overall performance in the unit.

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/>

Alternatively, the URL to access Blackboard directly is: <http://learn.mq.edu.au>

Use the Discussion Board on Blackboard to communicate with other students and the lecturers.

Learning Objectives and Outcomes

By the end of this unit students should be able to:

- ✓ organise and summarise data graphically and numerically
- ✓ analyse data using appropriate techniques
- ✓ draw conclusions from the results of data analysis

Generic Skills

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 for students to develop their skills in the following:

- ✓ manipulating and analysing data using Excel and the statistical package EcStat
- ✓ enhancing their problem solving ability
- ✓ improving their written communication skills, particularly report writing skills
- ✓ confidence in the use of the Internet for obtaining information and communicating with others in Online Discussions
- ✓ improving their ability to work co-operatively as a team member

Teaching and Learning Strategy

Lectures

Lectures begin in Week 1. Students should attend ONE 2-hour session per week. The Study Guide package should be brought to lectures each week as it contains copies of the lecture slides.

Tutorials

Tutorials begin in week 3 and are based on work from the previous lectures. The aim of tutorials is to practise techniques learnt in lectures. Tutorials are designed for students to 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 lectures. During these sessions you will use the statistical computer package EcStat and the techniques learnt during lectures to help solve statistical problems.

Assessment

The University's academic policy outlining the code of practice in relation to the conduct and management of assessment is available at:

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

COURSEWORK		EXAMINATIONS	
Assignments	15%	Class Tests	5%
GNATS	10%	Practical Test	5%
WASPS	5%	Final Examination	60%

Please note that a student must meet the performance standard outlined on page 6 in **both** the coursework **and** the examination sections of this unit in order to be awarded a particular grade.

Coursework Section:

Online quizzes provide students with timely feedback and the opportunity for students' to assess their progress. Group assignments are used to develop students' communication and collaborative skills.

General Network Assessed Tests (GNATs)

10 marks

Nine General Network Assessed Tests (GNATs) should be completed in your own time on any PC that is connected to the internet. This material is designed to give you an opportunity to practise the mechanical aspects of statistics. GNAT7 is designed for revision and is worth 2%. All other tests are worth 1%. You are allowed three attempts at each GNAT and the highest mark of the three will be recorded. Due dates are provided in the Unit Schedule on page 8.

Please see other important information regarding GNATs as outlined in the Study Guide package.

Web Assessment Using a Statistical Package (WASPs)

5 marks

In practical sessions you will use the beige worksheets provided in the Study Guide package. These have spaces to write your answers to the questions. These answers need to be transferred to WASPs on the Internet and will be assessed there. Each test is worth 0.5%. 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. Due dates are provided in the Unit Schedule on page 8.

Assignments marks

10

There are five assignments worth 3% each. They should be submitted by the due time and date in the assignment boxes located in BESS (E4B 106). 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 from the same tutorial class. Each individual must work on the entire assignment and contribute to their group's submission in order to obtain the marks awarded for that assignment.

Examination Section: Class tests, practical test and final examination

The examination section assesses a student's understanding of the material presented in the unit.

The first **class test** will be held in your tutorial in Week 13 of semester 1 and will cover all material up to and including week 11 lecture. The second **class test** will be held in your tutorial in Week 10 of semester 2 and will cover all material up to and including week 8 lecture. The **better** of the two class test results will contribute towards your final result.

The **practical test** will be held in your practical class in Week 13 in semester 2. It will cover all material in the unit. Note: you must sit these tests during your allocated classes.

A page of formulae and relevant statistical tables will be attached to the class test and the final examination. Students will be permitted to take one A4 sheet, handwritten on both sides, into the final examination. No extra material will be permitted in the class test or the practical test.

Students **MUST** perform satisfactorily in the **final examination** in order to pass the unit regardless of their performance throughout the semester. Students should note that, if they fail the final

examination, their coursework will not count and the SNG allocated will be based on their final examination mark only.

The University Examination 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/APSCons.pdf>

A supplementary examination will only be granted if a student has satisfactory coursework (ie. 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 after 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.

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.

Accessing Online Quizzes

There are two sets of quizzes you will need to complete during this unit, *WASPs* and *GNATs*. Note carefully the available dates for these online quizzes as indicated on page 8 of this document. You may complete the quizzes any time during the available time period, but we advise completing them early.

WASPs:

- During practical sessions, complete the exercises in the beige section of the Study Guide.
- Enter your answers into the spaces provided.
- Login to Blackboard: <http://learn.mq.edu.au>
- Click the Quizzes icon, click *WASPs*, then select the quiz you wish to complete.
- Enter the answers you provided on the beige practical sheets. There is only **one** attempt allowed for each *WASP*.

GNATs:

- Attempt the practice *GNATs* quiz in the green section of the Study Guide package and check the solutions at the back of this green section.
- Login to Blackboard (as above), click the Quizzes icon, click *GNATs*. Alternatively, login directly to Statquiz: <http://statquiz.efs.mq.edu.au>
- Here you will be presented with another login box. Your login is your Student ID and your password is also your student ID. For first time login you will need to change your password and then select the quiz.
- You must Temp Save to ensure the set of data you have on the screen does not change. **The data are different to that provided in the green document.** You can complete the quiz immediately or print it and enter your answers at a later time. You may have **three** attempts at each *GNAT*.

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).

Your raw mark for a unit (ie. the total of your marks for each assessment item, including the final examination) 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/rules/Guidelines2003.doc> or

<http://www.mq.edu.au/senate/rules/detailedguidelines.doc>

Your final grade in Stat170 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:

HD	High Distinction	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
D	Distinction	denotes performance which clearly deserves a very high level of recognition as an excellent achievement in the unit
Cr	Credit	denotes performance which is substantially better than would normally be expected of competent students in the unit
P	Pass	denotes performance which satisfies unit objectives
PC	Conceded Pass	denotes performance which meets unit objectives only marginally
F	Fail	denotes 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.

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/>

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

Members of the Statistics Department have consultation hours each week when they are available to help students enrolled in Introductory Statistics. These consultation hours will be listed on the doors of the Statistics staff located on the 5th floor of E4A. The list will also be available on the Web.

Unit Coordinators

For help with administrative matters students should contact the Unit Coordinator:

Tel: 9850 8257
email: debbie.loo@efs.mq.edu.au

Numeracy Centre

The Numeracy Centre was established 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 which is located in C5A225. The Centre offers a number of services including individual help, supplementary workshops which are run each week and an opportunity to meet with other students to discuss problems.

CD

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

Computing Laboratories

The Excel Add-in, EcStat, which is included on the CD and is installed in the computing labs in E4B, will be used in practical sessions and for assignments. Assignments, GNATs and WASPs can be completed in these rooms. You will need to bring a memory stick when using these computers. GNATs and WASPs can be completed on any PC that has access to the Internet.

Opening hours of computing laboratories:

During semester: 8am - 10pm Mon-Fri
 9am - 5pm Sat-Sun

For opening hours during semester breaks 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.

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PROGRAMME FOR FIRST SEMESTER

WEEK	LECTURE TOPIC	TEXT Chapter	Assessment Due (<i>Note that all Gnats and Wasps are due by 10pm</i>)
23 February W1	Introduction Study Design Simple Displays	1, 2	Obtain Study Guide and Text Book from Bookshop.
2 March W2	<i>... continued</i>		DEMO WASP: 2/3 – 26/5
9 March W3	Graphical Displays of continuous data	2	DEMO GNAT: 9/3 – 26/5
16 March W4	<i>... continued</i>		WASP 1: 16/3 – 3/4
23 March W5	Numerical summaries		
30 March W6	<i>... continued</i>	3, 4	GNAT 1: 30/3 – 26/4 Assignment 1 due
6 April W7	Normal Distribution	4	GNAT 2: 6/4 – 3/5 WASP 2: 6/4 – 3/5
SEMESTER BREAK: 10 April – 26 April			
27 April W8	Normal Distribution <i>continued</i>	4	
4 May W9	Sampling	5	GNAT 3: 4/5 – 17/5 WASP 3: 4/5 – 15/5
11 May W10	<i>... continued</i>		
18 May W11	Confidence Intervals	6	GNAT 4: 18/5 – 2/8 WASP 4: 18/5 – 29/5 Assignment 2 due
25 May W12	<i>... continued</i>		
1 June W13	Class Test		WASP 5: 1/6 – 31/7 FIRST CLASS TEST

After completing a quiz you must View Results in order that your WASP is graded. If any of your WASPs appears as UNGRADED then you should select View Scores for Quizzes from the 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. You should note that the cut-off dates on Blackboard are two days later than the due dates listed above. This is to allow for any problems which may arise with Blackboard. However, you should attempt all quizzes before the due dates.

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PROGRAMME FOR SECOND SEMESTER

WEEK	LECTURE TOPIC	TEXT Chapter	Assessment Due (<i>Note that all Gnats and Wasps are due by 10pm</i>)
3 August W1	Hypothesis Tests	7	GNAT 5: 3/8 – 16/8
10 August W2	... <i>continued</i>		
17 August W3	Comparisons: Two-sample Tests	8	GNAT 6: 17/8 – 30/8 GNAT 7: 17/8 – 13/9 WASP 6: 17/8 – 28/8
24 August W4	... <i>continued</i>		Assignment 3 due
31 August W5	Examining Relations	9	GNAT 8: 31/8 – 11/10 WASP 7: 24/8 – 11/9
7 September W6	Assessing Relations	9	WASP 8: 7/9 – 9/10
14 September W7	... <i>continued</i>		
SEMESTER BREAK: 19 September – 4 October			
5 October W8	Public Holiday Monday		Assignment 4 due
12 October W9	Categorical Data Analysis Hypothesis Tests	10	GNAT 9: 12/10 – 11/11
19 October W10	Class Test		WASP 9: 12/10 – 23/10 SECOND CLASS TEST
26 October W11	Categorical Data Analysis Odds ratios	10	
2 November W12	... <i>continued</i>		WASP 10: 2/11 – 13/11 Assignment 5 due
9 November W13	Unit summary		PRACTICAL TEST

Due dates will not be extended.