KEY INFORMATION

Unit website:

www.maths.uwa.edu.au/~nazim/3S6/

Unit lecturer:
Dr Nazim Khan.
Email nazim@maths.uwa.edu.au
Web page www.maths.uwa.edu.au/~nazim
Office 2.09, Mathematics.

Unit timetable:
odd weeks:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Venue</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Lecture</td>
</tr>
<tr>
<td>Monday</td>
<td>2:00-4:00</td>
<td>MCL</td>
<td>Lab class*</td>
</tr>
<tr>
<td>Wednesday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Lecture</td>
</tr>
<tr>
<td>Thursday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Lecture</td>
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even weeks:

<table>
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<tr>
<th>Day</th>
<th>Time</th>
<th>Venue</th>
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<tbody>
<tr>
<td>Monday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Lecture</td>
</tr>
<tr>
<td>Wednesday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Lecture</td>
</tr>
<tr>
<td>Thursday</td>
<td>12:00</td>
<td>MLR2</td>
<td>Tutorial*</td>
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*Tutorials and Lab classes include assessment
WHAT IT'S ABOUT: To enrol in this unit, you must already have learned a good deal of the theory of statistics. This unit focuses on applying statistical methods to real problems.

When we start to analyse real data, we may strike unexpected complications:

- some data may be missing, corrupted or inconsistent.
- standard methods (e.g. linear regression) may not answer the important question.
- standard methods may rely on assumptions (e.g. normality) that are not appropriate to our data.

Accordingly, this unit focuses on

- practical application of statistical methods to real data;
- extension of the statistical methods you already know, to a wider range of techniques;
- critical use of statistical methods.

HOW IT IS TAUGHT: The best way to learn applied statistics is to gain experience in analysing real data. This unit provides that experience through case studies and projects. The emphasis is on applying statistical methods to interesting practical problems, rather than on the theory behind the methods. Many of the class activities will be computer-based. We will make extensive use of the free statistical package R. You can download the package from www.r-project.org and install it on your own computer if desired.

WHAT IS TAUGHT:
The unit will cover the following topics (roughly 4 lectures each):

1. Principles of applied statistics
2. A primer on the R package
3. Data Visualisation and Smoothing Methods
4. Multivariate Techniques (Principal Components, Discriminant analysis, Clustering etc)
5. Time series
6. Nonlinear regression
7. Generalised linear Models (logistic regression/probit models, log-linear models)
8. Survival Analysis

WHAT YOU WILL TAKE AWAY: On completing this unit, students should have much greater ability and confidence to

- handle the practicalities of analysing real data;
- make correct choices of statistical technique for analysing real data;
- use statistical software skilfully;
- draw relevant conclusions from the results of statistical analysis;
- criticise weaknesses in a statistical analysis performed by other people.
PREREQUISITES: Prerequisites for this unit are: either

- Statistical Science 225 (STAT2225, formerly 530.225), or
- Statistical Models for Data 226 (STAT2226, formerly 530.226) and either
  - Statistical Analysis of Experiments 227 (STAT2227, formerly 530.227), or
  - Biometrics 301 (STAT3301, formerly 706.301)

ASSESSMENT:

<table>
<thead>
<tr>
<th>WHAT</th>
<th>HOW MANY</th>
<th>WEIGHT EACH</th>
<th>TOTAL WEIGHT</th>
</tr>
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<tbody>
<tr>
<td>Quizzes</td>
<td>six</td>
<td>5%</td>
<td>30%</td>
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<tr>
<td>Assignments</td>
<td>three</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>Computer-based tests</td>
<td>four</td>
<td>10%</td>
<td>40%</td>
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<tr>
<td>Written exam</td>
<td>none</td>
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Quizzes are short (5–15 minute) written tests, conducted during tutorial times under standard exam conditions. A quiz is completed by ticking multiple-choice answers or filling in small answer boxes on a question sheet. Quizzes will be assessed against a standard answer sheet.

Assignments require you to perform a series of tasks including analysing data, writing a short report on the analysis, and drawing conclusions. Assignments must meet a specified deadline and other conditions (such as not exceeding a specified maximum length). Assignments will require the use of the software package R, and can be completed using either the computers in the MCL, or your own computer. Assignments will be assessed on (1) the data analysis: appropriate choice of methods for problem, correct application of methods to data; and (2) the written report: faithful reporting of the analysis, correct interpretation of results, adherence to report requirements.

Computer-based tests will be conducted in the MCL, under standard exam conditions, during some of the scheduled lab times (at least one week’s notice will be given). A computer-based test requires you to analyse data (using the statistical package R), and write a very short summary of your results, on a printed sheet. Test scripts will be assessed on the appropriate choice of methods, correct application of methods to data, and correct interpretation of results.

Late submission of assignments: The deadline for submission of solutions will be stated on each assignment. Unless negotiated prior to the due date, late assignments attract a 20% penalty per day.

UNIT LECTURER: Dr Nazim Khan. Office 2.09 School of Mathematics & Statistics. Email nazim@maths.uwa.edu.au, Web page www.maths.uwa.edu.au/~nazim

OFFICE CONTACT HOURS: You are welcome to drop in and see me in my office during office hours and I will see you if I am in and available. You are welcome to email me for an appointment or with queries. I cannot send text responses to mobile phones (by university policy).

UNIT WEBSITE: All handouts and other information will be available via the WWW page for this unit:

www.maths.uwa.edu.au/~nazim/3S6/

ANNOUNCEMENTS Announcements about the unit will be sent to your university email account. Check this email account regularly. For more information about your student email account, and how to activate it, see

www.ucs.uwa.edu.au/web/students/email
REFERENCES:


BEDTIME READING:


RELEVANT FACULTY POLICIES:

This unit is governed by the academic policies of the Faculty of Engineering, Computing and Mathematics, which can be consulted at:

www.ecm.uwa.edu.au/studentnet/exams

Scaling: final marks may be rescaled:


Academic dishonesty: Academic dishonesty or plagiarism is taking someone else’s thought, writing or invention and claiming it as your own. Plagiarism or other forms of academic dishonesty may result in a mark of zero for an assignment, a mark of zero for the unit, or expulsion from the university. See the Faculty policy

www.ecm.uwa.edu.au/studentnet/exams/dishonesty

You are encouraged to discuss assignments with other students and to solve them together. However, unless you are instructed to the contrary on an assignment or test sheet, your solutions to assignment or test questions must be your sole effort (i.e. not copied from anyone else).

Appeals: the policy on examinations and appeals is set out at

www.ecm.uwa.edu.au/studentnet/exams

GENERIC SKILLS/OUTCOMES STATEMENT: Students are able to apply statistical reasoning to analyse the essential structure of problems in various fields of human endeavour; extend their knowledge of statistical techniques and adapt known solutions to different situations; communicate effectively with others; present results in a logical and coherent fashion; and undertake continuous learning, aware that an understanding of fundamentals is necessary for effective application.