Unit Outline*

MGMT8504
Data Analysis and Decision Making

EMBA
Trimester 2, 2011
Crawley

Assistant Professor Ed Cripps

Business School
www.business.uwa.edu.au

* This Unit Outline should be read in conjunction with the Business School Unit Outline Supplement available on the Current Students web site http://www.business.uwa.edu.au/students
UNIT DESCRIPTION

Introduction

I would like to warmly welcome you to the Data Analysis and Decision Making unit held in trimester 2, 2011. I hope you are enthusiastic about taking this unit, and trust that you will find it enjoyable and applicable to your work. I expect that many of you are feeling nervous about taking this unit, especially if this is the first time you have studied statistics. I would like to reassure you that this is quite normal. I hope that as we work through the topics together you will start to feel more comfortable, and even may start to enjoy learning about ‘stats’. In our experience, learning about statistics is similar to learning a new language or skill; initially you will be confused, then frustrated, and finally (with hard work and perseverance) you will understand how to use and apply the statistical tools and techniques discussed in the seminars. Therefore, you need to continuously read your textbooks and work through several exercises so that you quickly reach the point where everything makes sense.

I cannot stress enough how important it is to continuously study throughout the term, as many of the topics covered in this unit are cumulative. To help you with this I have included an in-class quiz to encourage you to keep up with the workload and help you prepare for the exam (and hopefully reduce some exam anxiety). You also need to complete a ‘Statistics in Practice’ project, which requires you to identify an issue in an organisation, collect and analyse relevant data, then provide appropriate recommendations. There is also a class participation mark and an exam.

Please note that at any time you feel overwhelmed all you need to do is contact me so that we can work through your concerns together, the earlier the better.

All materials are made available in WebCT and we urge you to use it on a weekly basis.

During all teaching activities, we encourage discussion on how the subject matter relates to your experience.

Unit content

This unit introduces data analysis and decision making tools used in business. You will be able to identify situations in which quantitative analysis is necessary to support problem solving and decision-making. You will also gain experience in applying data and decision analysis techniques in real life contexts. Being ‘hands-on’, students will become confident in using software (Excel) to present and analyse data.

Topics covered will include:

- Introduction to the use of statistics and decision making techniques in business and management;
- Measurement, variability, uncertainty, probability;
- Techniques for summarising data and presenting summaries;
- Statistical tests, inference from data;
- Prediction and forecasting, introduction to regression and time series analysis.

This unit provides the foundations for quantitative techniques used in other specialised units.
The goal of the unit

Through this unit, you will develop fundamental skills for analysing problems and making decisions using quantitative data. “Nobody can escape data analysis.” (Ang Wei – PricewaterhouseCoopers, student UWA 2005)

Any manager operating in a business environment requires as much information as possible about the characteristics of that environment. Much of the available information is quantitative, for example, movements in interest rates, stock market price, money supply and the level of unemployment. Market research surveys are carried out to determine the strength of product demand. An auditor is concerned about the number and size of errors found in account receivables. A human resource manager may be able to use aptitude test scores, in addition to subjective evaluation of candidates, for the recruitment of personnel. Even in sport, statistics is increasingly used as an objective means to assess the signing of players and also to evaluate the strengths and weaknesses of opponents. If you think about it we confront statistics in most of our everyday life.

Learning outcomes

On successful completion of this unit, you should be able to:

- Perform exploratory data analysis and data presentation;
- Critically appraise the accuracy and relevance of data, the suitability of the statistical models, and the quality of reporting/arguments based on them;
- Use appropriate statistical packages and add-ins for data analysis with confidence;
- Support decision-making process on information extracted from applying basic data analysis techniques;
- Communicate decision analysis results to stakeholders.

Educational principles and graduate attributes

In this unit, you will be encouraged and facilitated to develop the ability and desire to:

- Undertake problem identification, analysis, and find the appropriate statistical and decision-making tools to describe and model it;
- Master the subject matter, concepts and techniques, apply and adapt the acquired knowledge to your own business data analysis and decision-making;
- Enhance competencies to work more effectively independently (through individual analysis) and in teams (through the completion of a team data analysis);
- Develop competencies on the presentation of data analysis through the ‘Statistics in Practice’ assignment where results and information have to be presented clearly, concisely, and logically;
- Think and reason creatively about data and decision analysis and use computer applications;
- Develop more effective communication skills through a class presentation on the findings of your data analysis/review and by responding to any questions that arise following that presentation.
TEACHING AND LEARNING RESPONSIBILITIES

Teaching and learning strategies

Several types of activities are included in this unit to make your learning easier, engaging, stimulating. The aim is to provide you with the essential toolkit for data analysis and decision-making in your workplaces.

Lectures will be combined with discussions, debates on reports or cases demonstrating the use of a particular technique, and practical hands-on sessions to reinforce the elements acquired for each topic. Your accumulated knowledge and experience, your ideas will then get to fruit in your own projects and solved problems.

You will have the opportunity to work individually or to exchange ideas and collaborate in groups. You are encouraged to draw on your own work experiences and share ideas with your colleagues on particular use of data and how decisions are made.

Lecture activities

Hard copies of lecture slides are provided to you and made available in WebCT. Lectures are designed to consolidate the readings from the textbook and encourage critical appraise of business statistics. During lectures we will present concepts and work through examples, discuss case studies, reports, and articles.

Labs/Workshops

The labs/workshops are important for your progress in this unit as the aim is to offer practical (“hands-on”) introduction to data and decision analysis. You will then be able to check your understanding of the course content and apply the concepts and methods from this unit to your decisions.

Teaching and learning evaluation

You may be asked to complete two evaluations during this unit. The Student Perception of Teaching (SPOT) and the Students’ Unit Reflective Feedback (SURF). The SPOT is optional and is an evaluation of the lecturer and the unit. The SURF is completed online and is a university wide survey and deals only with the unit. You will receive an email from the SURF office inviting you to complete the SURF when it is activated. We encourage you to complete the forms as your feedback is extremely important and can be used to make changes to the unit or lecturing style when appropriate.

But more importantly, continuous communication and feedback from you (every day in class and via WebCT) is taken into consideration in updating and improving the unit.

In relation to the MGMT8504 unit, previous student feedback has resulted in several changes over time, such as:

- Changes to the delivery of the unit where the focus is now on the interpretation of results rather than formulae and computation. This is seen as a more suitable and useful approach to subject for postgraduate students and especially for MBA students;
- Changes in the learning and teaching strategies, now including more case studies, lab activities, real world examples. This is to further encourage active learning, so that you learn by doing;
- Changes to the assessment – a practical component followed by a presentation, using data from students’ workplace. This was done so that you are able to see the relevance of the material more clearly.
Attendance

Participation in class, whether it be listening to a lecture or getting involved in other activities, is an important part of the learning process, therefore it is important that you attend classes. More formally, the University regulations state that ‘to complete a course or unit students shall attend prescribed classes, lectures, seminars and tutorials’. Where a student, due to exceptional circumstances, is unable to attend a scheduled class, they are required to obtain prior approval of the unit coordinator to be absent from that class. Any student absent from class without having had such absence approved by the unit coordinator may be referred to the faculty for advice and may be required to withdraw from the unit.

CONTACT DETAILS

We strongly advise students to regularly access their student email accounts. Important information regarding the unit is often communicated by email and will not be automatically forwarded to private email addresses.

<table>
<thead>
<tr>
<th>Unit coordinator/lecturer</th>
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<tbody>
<tr>
<td><strong>Name:</strong></td>
<td>Ed Cripps</td>
</tr>
<tr>
<td><strong>Email:</strong></td>
<td><a href="mailto:ecripps@maths.uwa.edu.au">ecripps@maths.uwa.edu.au</a></td>
</tr>
<tr>
<td><strong>Phone:</strong></td>
<td>+61 8 6488 3227</td>
</tr>
<tr>
<td><strong>Consultation hours:</strong></td>
<td>Thursday 10:30am – 12:30pm or by appointment</td>
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</tbody>
</table>
| **Lecture & lab times:** | Lecture: Saturdays, 9.00am – 4.00pm  
Lab: As agreed upon in Lectures |
| **Lecture dates:**       | Week 1: 21 May 2011  
Week 2: 4 June 2011  
Week 3: 18 June 2011  
Week 4: 2 July 2011  
Week 5: 16 July 2011  
Week 6: 30 July 2011 |
| **Lecture venue:**       | Lecture: BUSN:G42 Michael Chaney Case Study  
Lab: Business School Computer Labs G85 and G86 |
TEXTBOOK(S) AND RESOURCES

Unit website
This unit is supported in WebCT. WebCT can be accessed at www.webct.uwa.edu.au or by following the link on the unit web site. At the WebCT Welcome screen, click on Log into My WebCT and you will be prompted for a WebCT ID and password. Your WebCT ID will be your student number. Any letters must be in upper case (capitals). Your password will be your student PIN. Your login details must be kept confidential.

After you have logged in, the page called My WebCT will appear personalised with your name. Under Courses, WebCT courses for which you have access will be listed. When you have finished using WebCT, do not forget to log-out. There is a log-out button on the top of your homepage as well as on the My WebCT page.

Recommended/required text(s)

Software requirements
This unit will use Excel, hence prior knowledge of Excel is desirable, but not essential. The textbook provides instructions on how to use specific features and the sessions in the lab are designed to make everyone comfortable with the software. Students are most welcome to use a statistical package at their choice for analysis if they have access to that package (e.g., SPSS, SAS, R).

For the quiz or the exam, as the emphasis is on interpretation, there is no need for sophisticated scientific calculators.

Additional resources and reading material
Any statistics/data analysis textbook available in the library may assist you with the concepts.

We will use databases included in the textbook, provided by the lecturer, or obtained via library.

For your project, it is recommendable that you use data from your workplace. However, if is it not possible or suitable, several other sources may be investigated:

- Australian Bureau of Statistics (time series, census data, etc.) www.abs.gov.au;
- DatAnalysis (Australian Stock Exchange ASX companies);
- Global Market Information Database (GMID);
- Mergent Online (US companies data);
## UNIT SCHEDULE

<table>
<thead>
<tr>
<th>Session #</th>
<th>Lecture</th>
<th>Seminar/lab questions</th>
<th>Text Chapters</th>
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<tbody>
<tr>
<td><strong>Module 1: Presenting Data</strong></td>
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<tr>
<td><strong>21st May</strong>&lt;br&gt;1</td>
<td>Introduction to data analysis and decision making&lt;br&gt;Presenting data graphically and using data summaries</td>
<td>MS Excel tools for data description&lt;br&gt;Discussion of data for group projects.</td>
<td>Chapters 1-2</td>
</tr>
<tr>
<td><strong>21st May</strong>&lt;br&gt;2</td>
<td>Continuation of data presentation introducing statistical summaries</td>
<td>Summary statistics in Excel</td>
<td>Chapter 3</td>
</tr>
<tr>
<td><strong>4th June</strong>&lt;br&gt;1</td>
<td>Computations, Excel in Statistics.&lt;br&gt;Statistical report writing.</td>
<td>For Excel, as above with instructions from lecturer.&lt;br&gt;Statistical report writing discussed by lecturer.</td>
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<tr>
<td><strong>Module 2: Probability Distributions and inference</strong></td>
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<tr>
<td><strong>4th June</strong>&lt;br&gt;2</td>
<td>Probability Theory&lt;br&gt;Objective/subjective assessment&lt;br&gt;Probability rules&lt;br&gt;Conditional and joint probabilities&lt;br&gt;Bayes’ theorem</td>
<td>Probability basics – exercises</td>
<td>Chapter 4</td>
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<tr>
<td><strong>18th June</strong>&lt;br&gt;1</td>
<td>Probability Distributions&lt;br&gt;Binomial, exponential&lt;br&gt;Poisson and normal distributions&lt;br&gt;Making statistical inferences from observed data</td>
<td>Data set description for statistical report</td>
<td>Chapters 5-6</td>
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<tr>
<td><strong>18th June</strong>&lt;br&gt;2</td>
<td>Statistical inference&lt;br&gt;Sampling.&lt;br&gt;Confidence intervals.</td>
<td>Probability basics – exercises</td>
<td>Chapters 7-8</td>
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<tr>
<td><strong>2nd July</strong>&lt;br&gt;1</td>
<td>Hypothesis testing:&lt;br&gt;Types of errors, p values;&lt;br&gt;One and two-sample tests;&lt;br&gt;Comparing group differences;&lt;br&gt;2 test for independence;&lt;br&gt;We will work through examples and focus on the interpretation of the results.</td>
<td>Mid-term quiz (Modules 1 and 2, covered until 18th June)</td>
<td>Chapters 9-10&lt;br&gt;Chapter 12-13 (part)&lt;br&gt;Groebner et al. (2011)</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Notes</td>
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| 2nd July  | 2  
Simple linear Regression  
Correlations  
Simple linear regression – assumptions, solution, interpretation  
Practice regression analysis (MS Excel)  
Chapter 14 |                                                              |
| 16 July   | 1  
Multiple Linear Regression  
Solution, interpretation, diagnostics, violation of assumptions;  
Prediction with MLR.  
Multiple linear regression exercises  
Chapter 15 |                                                              |
| 16 July   | 2  
Multiple Linear Regression Continued  
Possibly using regression to analyse time series data for forecasting or to consolidate regression diagnostics. |                                                              |
| 30 July   | Reports due, presentations and REVIEW OF UNIT |                                                              |

**Note:** Changes may occur in the lecture schedule with respect to material covered. No modifications are to be made to assessment.
### ASSESSMENT MECHANISM

**The purpose of assessment**

There are a number of reasons for having assessable tasks as part of an academic program: providing opportunities for you to check your understanding of the course content and to explore data analysis and decision making relevance through real life examples, including your own experiences; encouraging you to explore and understand the subject fully and make connections with other disciplines or situations already known; foster collaboration with peers and enhance data analysis computing skills; acknowledge your efforts and progress in mastering the subject. The fact that we grade your work then gives you an indication of how much you have achieved – “Doing is demonstrating that you know it.” Providing feedback on your work also serves as part of the learning process.

In this unit we use a combination of individual and group assignments meant to continuously review your progress and facilitate the communication with your peers.

### Assessment mechanism summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
<th>Due date</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Data description of the statistical report</td>
<td>10%</td>
<td>18th June</td>
<td>Team assignment – 500-700 words/ 4 pages max report LODGED ONLINE IN WebCT</td>
</tr>
<tr>
<td>Mid term quiz (Module 1 and 2, covered until 18th June)</td>
<td>20%</td>
<td>2nd July</td>
<td>Open book, submitted in class – 1 hour</td>
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<tr>
<td>Final Statistical Report</td>
<td>10%</td>
<td>30th July</td>
<td>Team project:</td>
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<td></td>
<td></td>
<td>• Final Report Due: 1200 words/10 pages max</td>
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<td></td>
<td></td>
<td>LODGED ONLINE IN WebCT</td>
</tr>
<tr>
<td>Presentation of Statistical Report</td>
<td>10%</td>
<td>30th July</td>
<td>• Team presentation in class 10 min</td>
</tr>
<tr>
<td>Final exam (all modules)</td>
<td>50%</td>
<td>Exams period August 2011</td>
<td>Closed book exam – 2 hours</td>
</tr>
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**Note 1:** Results may be subject to scaling and standardisation under faculty policy and are not necessarily the sum of the component parts.

**Note 2:** Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning outcomes as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the unit.
Assessment components

There are three main aspects to your assessment: A Mid-term quiz, a 'Statistics in Practice' take home assignment and a final end of term exam. The details for each are described below.

Assessment: Mid-Term Quiz (20%)

Description

The purpose of the quiz is to help you evaluate your understanding of data analysis and probability. The quiz is designed to provide you with helpful feedback on the issues associated with appropriate use, analysis, and interpretation of data analysis and probability distributions.

The quiz is worth 20% and it'll be held on the 2nd July 2011. The quiz will take 1 hour (excluding reading time) and it is focused on interpretation of output. Textbook and non-programmable calculators (approved by UWA) and statistical tables are permitted for use during this test.

Assessment Criteria

Multiple choice questions (10%) and short answer/calculation questions (10%) are included in the test.

Assessment: ‘Statistics in Practice’ (30%)

Description

The 'Statistics in Practice' assessment is designed to develop your skills in the correct use of statistical tools presented throughout the unit and their interpretation. It is also designed to instruct you how to write and interpret a statistical report accurately and to present this to an audience. This is a team project where the main task is to analyse existing data and prepare a report for management using exploratory data analysis and statistical inference.

Data for your project can come from your workplace or it can be a publicly available database. In either case, please check the suitability of the data for your project with your lecturers.

In total the project contributes 30% towards your final grade. It is split into 3 incremental parts each marked separately.

A) Statistics in Practice Assessment #1: Data description of the Statistical Report (10%)

This is due 18th June and will include a description of the problem you are addressing and the data you will use to address this problem. This should be no longer than 500-700 words and 4 pages. Initial description of the data is also known as the exploratory analysis and the data are analyzed on their own terms, with minimal background assumptions. The aim is to organize and summarize the data to bring out their main features and clarify their underlying structure. A clear definition of all variables used in the report should be presented along with numerical and graphical summaries these data. Numerical and graphical summaries of the data are, and their presentation in a report, will be discussed in lectures on 21st May and 4th June. This part of the project is worth 10%.
B) Statistics in Practice Assessment #2: Final Statistical Report (10%)

The final, and complete, report is due 30th July and will include the following:

1. **Title page:** Includes your name, title of the report and its word length.

2. **Abstract:** A single paragraph (50 words) that describes the problem and the most important findings.

3. **Table of Contents:** Gives an outline of the report together with the number of pages.

4. **Introduction.** Several paragraphs in which you describe the background, question of interest and the relevant dataset. The key variables and relevant assumptions should be discussed. Data collection methods, data reliability and trustworthiness of the source should also be discussed.

5. **Data Description:** Summarize the data you will use in your inferential analysis using appropriate statistical techniques and charts. This and the previous section will be largely completed in the Statistics in Practice Assessment #1 but now need to be incorporated into the body of the final report.

6. **Inference:** This section should present the specific statistical inference, in the form of hypothesis tests and confidence intervals, required to answer address the question/s of interest. Linear regression will be a major component of this section.

7. **Conclusions:** Summarise the key findings and make recommendations for the appropriate analysis.

8. **References:** Harvard Style or Endnote (please consult the Referencing section and contact me for any unclear elements).

9. **Appendix:** A statistical report should contain details of statistical results that may clutter the report and dampen its main conclusions. Often statistical inference is based on statistical assumptions about the data that should be verified. The appendix can also provide evidence that these assumptions are sensible. The appendix is not included in the word count but should be thoughtfully presented and provide easy access to an interested reader.

A max of 1200 words (excluding tables, charts) is allocated for this assignment. The full size of the assignment should not exceed 10 pages. Any information above the word limit will not be taken into consideration. This part of the project is worth 10%.

C) Statistics in Practice Assessment #3: Presentation of Statistical Report (10%)

This assessment requires students (in the same teams as for the reports) to present and discuss their statistical analysis to the class. Building on Assessment item #2, this assignment has requires you to prepare a presentation for management based on the results of your analysis.

The purpose of the assignment is to facilitate debate between the team members (sharing their thinking), who are then challenging and engaging the class into a larger discussion on the findings. It also provides a demonstration of the oral communication skills and application of knowledge to statistical context.

The presentation should last a maximum of 10 minutes. The presentations will be organised on the 30th July. Powerpoint slides (or any type of presentation), along with the original material discussed will be provided to your lecturer before the presentation (to be uploaded in WebCT before the day of presentation). This part of the project is worth 10%.
Assessment: Final Exam (50%)

Description

The final exam will cover ALL lecture material, and will be held in the exam period (August 2011).

The exam will be 130 minutes (2 hours 10 minutes) long, including reading time, and will contain a combination of multiple choice and short answer questions. It will be closed book and is worth 50% of your final mark.

Assessment Criteria

To pass this unit, students are required to achieve a score of at least 50% in the final exam (25 marks). Students who fail to achieve the minimum standard in the final exam but achieve an accumulated score based on all assessment components for the unit of 50 and above will be awarded a final mark of 48%.

Submission of assignments

Assignments should be submitted on the due date on WebCT.

Late assignments will attract a penalty of 5% per day. The lecturer only in exceptional circumstances will waive this penalty. No marks will be awarded to assignments submitted after other students in the class have had their assignments returned.

Assignments will be returned in class or in WebCT. It is the intention that the marked assignments will be returned within two weeks of submission.

Student Guild

Phone: (+61 8) 6488 2295
Facsimile: (+61 8) 6488 1041
E-mail: enquiries@guild.uwa.edu.au
Website: http://www.guild.uwa.edu.au

Charter of Student Rights and Responsibilities


Appeals against academic assessment

The University provides the opportunity for students to lodge an appeal against assessment results and/or progress status (refer http://www.secretariat.uwa.edu.au/home/policies/appeals ).