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1 Subject Outline

1.1 Introduction

Welcome to QM1.

This subject covers core concepts which underpin quantitative analysis in economics and commerce. It provides a foundation for second-year quantitative subjects, and prerequisite information for other subjects in a commerce degree. The topics covered are descriptive statistical measures, including location and dispersion and graphical methods; probability, random variables and expected values; sampling; estimation and testing using the normal and t-distribution; chi-squared tests of variance; simple regression and correlation. With time permitting, there will also be an introduction to time series analysis. Excel is used to illustrate applications in accounting, economics, finance, management and marketing.

1.2 Subject Aims

The subject aims are to teach students the basic quantitative methods used in modern organisations and to provide a foundation for future study in both econometrics and quantitative methods more broadly.

Students should be able to identify and apply suitable statistical techniques for describing data and making inferences from those data. Also, by studying the basic principles of estimation and hypothesis testing, they will acquire the foundation to study more advanced tools used for investigating relationships between important variables in economics, finance, accounting, marketing and management.

At a broader level, studying this subject will give you an appreciation of the analysis behind research conclusions that are reported in the media and in print, and the ability to critically evaluate those conclusions.

For a formal statement of the subject objectives and the generic skills you will develop through successful completion of this subject, please see:


To view the learning goals, generic skills and graduate attributes for your degree, please locate the entry for your degree at in the University Handbook:

http://handbook.unimelb.edu.au

1.3 Prerequisites

VCE Mathematical Methods (CAS), or equivalent. It is assumed that students have learned concepts of algebra, differential calculus, probability and probability distributions.

1.4 Subject Structure

Broadly speaking the subject will be concerned with three broad areas of study.

Data Reduction First, we will explore the use of statistical techniques for data reduction. Here the aim is to explore techniques that can be used to summarize data using statistics of smaller dimension than the original data set. Examples of the techniques considered include graphical methods, index numbers, and various other descriptive statistics.

Probability Second, we need to develop appropriate probabilistic tools to enable us to explore the final topic of statistical inference. We will explore various probability distributions together with notions of sampling.
**Statistical Inference**  Finally, statistical inference is concerned with learning about populations on the basis of sample data. It combines many of the ideas of the previous two topics. Here we will explore techniques of estimation and hypothesis testing for both conditional and unconditional models. Regression modelling will be an important application of these ideas.

1.5  **Prescribed References**


In subject material, the textbook will often be referred to as “SSK”. Note that:

- the sixth edition is the only one supported by the subject;
- some bookshops have the abridged edition; you need the *full version* (the one *without* ‘Abridged’ anywhere in its title).

Required readings will be provided with each lecture.

2  **Academic Staff Contact Details**

**Lecturer Contact Details**

Dr. Jonathan Thong  
Office: Room 465, FBE Building  
Email: jonathan.thong@unimelb.edu.au  

Office Hours: By Appointment

**Administrative Coordinator Contact Details**

Dr Wasana Karunarathne  
Office: Room 335, FBE Building  
Tel: 8344 4866  
Email: lakminik@unimelb.edu.au  

Office Hours: Friday 2pm–4pm

**Tutor Contact Details**

Please check the subject’s LMS page for consultation times and for tutor contact details.

**Email Protocol**

Please note that we are only able to respond to student emails coming from a University email address. Please do not use personal email addresses such as Yahoo, Hotmail or even business email addresses. Emails from non-University email addresses may be filtered by the University’s spam filter, which means that we may not receive your email. All correspondence relating to this subject will only be sent to your University email address. Note that you must first activate your University email address before you can send or receive emails at that address. You can activate your email account at this link:

http://accounts.unimelb.edu.au/
While academic staff endeavour to address queries received via email, it is more appropriate to resolve substantive questions during lectures and tutorials and during normal consultation hours. With this in mind, we encourage students to attend all lectures and tutorials and to familiarise themselves with the consultation hours offered by the lecturers and tutors in this subject.

3 Lectures and Tutorials

3.1 Lecture Times

<table>
<thead>
<tr>
<th>Stream</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11:00am – 12:00pm</td>
<td>–</td>
<td>10:00am – 11:00am</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>–</td>
<td>9:00am – 10:00am</td>
<td>1:00pm – 2:00pm</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>–</td>
<td>10:00am – 11:00am</td>
<td>–</td>
<td>11:00am – 12:00am</td>
</tr>
<tr>
<td>4</td>
<td>–</td>
<td>11:00am – 12:00am</td>
<td>–</td>
<td>1:15pm – 2:15pm</td>
</tr>
</tbody>
</table>

Wednesday lectures are held in the Copland Theatre in the basement of The Spot (198 Berkeley St). All remaining lectures are held at the Public Lecture Theatre in Old Arts. Lectures commence 5 minutes after the designated starting time. You are expected to be seated and quiet at that time. If for any reason you arrive late then please enter the lecture theatre causing as little disruption as possible.

3.2 Lecture Participation Requirements

You are expected to have completed the required reading for each topic before attending the lecture. See the subject’s LMS page for a list of required reading.

3.3 Lecture Slides

The lecture slides used during lectures will be available for download from the subject’s LMS page prior to each lecture.

3.4 Tutorial Times

After subject registration, students are allocated to available classes. It is a student’s responsibility to ensure their registrations produce a clash-free timetable. Until it closes on Friday 13 March at 5pm, students can make changes to their timetable by following the instructions provided in the Student Portal. Timetable and venue information for all University lectures and tutorials can be found via the university timetable at: https://sis.unimelb.edu.au/cgi-bin/subjects.pl. Please note you will only be able to change your allocated tutorial time if there is space in alternative tutorials. Late enrolment into tutorials is handled by the Commerce Student Centre. More information about the new Student Timetable system is available on the Faculty’s website:

http://fbe.unimelb.edu.au/csc/planning/timetables

Tutorials commence in Week 2 (the week commencing Monday, March 9), and each tutorial covers the content from lectures in the previous week.
3.5 Tutorial Participation Requirements

The most effective way to learn in this subject, and to get a good grade, is to work consistently and conscientiously throughout the semester. Tutorials and the prescribed homework related to them are designed to help you do this. It is particularly important to keep up with the tutorial work in this subject because, after the first few weeks, the content continues to build on early, relatively simple ideas to move quickly into quite complex theories and applications.

Each week, you will be provided with required readings that you are expected to complete before attending lectures, and with questions that you are expected to complete after attending the lecture and before attending your tutorial. The work you do in tutorials assumes and requires that you have completed these readings and the corresponding preparation. You should bring a calculator to tutorials.

Suggested solutions to tutorial questions will be placed on the LMS page after all tutorials for that week have been held.

3.6 Using Lecture Capture (Echo 360)

Audio recordings of the lectures will be made available for review in the days following the lecture. Audio recordings of lectures allow you to revise lectures during the semester, or to review lectures in preparation for the end of semester exam.

You can access recorded lectures by clicking on the Lecture Recordings (or similar) menu item in the LMS page for this subject.

Please note that lecture recordings are not a substitute for attendance; rather they’re designed for revision. On rare occasions the lecture capture system can fail to record the lecture due to technical reasons. In such cases, the lecture recording will not be made available.

4 Lecture Topics & Reading Guide

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Relevant SSK Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, Data Visualisation</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>2</td>
<td>Descriptive Statistics</td>
<td>Chapters 4, 5</td>
</tr>
<tr>
<td>3</td>
<td>Simple Linear Regression</td>
<td>Chapter 18</td>
</tr>
<tr>
<td>4</td>
<td>Probability Theory I</td>
<td>Chapters 6, 7</td>
</tr>
<tr>
<td>5</td>
<td>Probability Theory II</td>
<td>Chapters 7, 8</td>
</tr>
<tr>
<td>6</td>
<td><strong>EASTER BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Probability Theory III</td>
<td>Chapters 7, 8</td>
</tr>
<tr>
<td>8</td>
<td>Inference I</td>
<td>Chapters 9, 10</td>
</tr>
<tr>
<td>9</td>
<td>Inference II</td>
<td>Chapters 11, 12</td>
</tr>
<tr>
<td>10</td>
<td>Hypothesis Testing I</td>
<td>Chapters 13, 14</td>
</tr>
<tr>
<td>11</td>
<td>Hypothesis Testing II</td>
<td>Chapter 15</td>
</tr>
<tr>
<td>12</td>
<td>Simple Linear Regression</td>
<td>Chapter 18</td>
</tr>
<tr>
<td>13</td>
<td>Review</td>
<td>See notes</td>
</tr>
</tbody>
</table>
5 Assessment

5.1 Assessment Overview

Your assessment for this subject comprises the following:

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Individual or Group</th>
<th>Due</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>Individual/group</td>
<td>Week 4</td>
<td>10%</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>Individual/group</td>
<td>Week 8</td>
<td>10%</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>Individual/group</td>
<td>Week 12</td>
<td>10%</td>
</tr>
<tr>
<td>End-of-semester exam</td>
<td>Individual</td>
<td>Examination period</td>
<td>70%</td>
</tr>
</tbody>
</table>

5.2 Assignments (10% each)

You are encouraged to work on the assignments in groups of up to but no more than four students and to submit a single electronic copy as a group. All members of a group submitting a single assignment must belong to the same tutorial and all members of the group will be given the same mark. Students may choose to work and hand in an assignment on their own if they wish.

It is possible that due dates for one or more of the assignments will also be due dates for work in another subject or subjects. Be mindful of this. The assignment questions will be made available 14 days in advance of the due date.

Assignments are to be submitted electronically via the Assignment Tool online (not via email).

Submissions should be in .pdf format, and must have the name and student number of all students (if working in a group) on the first page.

Solutions to each assignment will be made available on the LMS the week after they are due to provide students with feedback.

5.3 Late Submission of Assignments

If you are unable to submit your assignment on time, you may apply to the Commerce Student Centre to determine whether you are eligible for an assignment extension. Please note that this does not imply that there exists a guarantee that you will receive an extension. Details about extension eligibility can be found at the following link:

http://fbe.unimelb.edu.au/csc/assistance/assignment_extension

You must apply for an assignment extension BEFORE OR ON THE DATE that your assignment is due. Extensions of more than a week following the due date will NOT be granted as the solutions to each assignment will be posted then.

5.4 Using the Assignment Tool

The Assignment Tool allows you to submit your assignment to your lecturer online from home or from any of the student labs on campus.

During the course of the semester, you’ll be asked to submit three assignments in electronic format into the Assignment Tool. You can access the Assignment Tool by clicking on Assignment Tool in the navigation menu from the LMS page for this subject.

A student guide has been prepared on the use of the Assignment Tool. The guide provides instructions on how to submit assignments in hard-copy format. The guide can be downloaded here:

Please note that you are required to keep a copy of your assignment after it has been submitted, as you must be able to produce a copy of your assignment at the request of your tutor or lecturer at any time after the submission due date.

5.5 Referencing

All sources used for a written piece of assessment must be referenced. This is to acknowledge that your material is not based entirely on your own ideas, but is based, in part, on the ideas, information, and evidence of others. This is desirable as you are attending University in order to learn from others.

You will be required to use the APA system or Harvard System of referencing. The FBE Centre for Excellence in Learning and Teaching (CELT) has prepared a booklet for each system specifically to assist students to reference correctly. Each booklet contains many examples that will help you when preparing your assignments. The booklets can be found at the following locations:


It is important that all material you present for assessment is referenced correctly. Material that has not been referenced correctly may be considered to be plagiarised, and as such may be penalised. We will also look for evidence that material included in the bibliography has been used in the assignment. Including references that have not been used may also result in your assignment being penalised.

5.6 Plagiarism, Collusion, and Other Forms of Cheating

Presenting material from other sources without full acknowledgement (referred to as plagiarism) is heavily penalised. Penalties for plagiarism can include a mark of zero for the piece of assessment or a fail grade for the subject.

Plagiarism is the presentation by a student of an assignment identified as his or her own work even though it has been copied in whole or in part from another student’s work, or from any other source (e.g. published books, web-based materials or periodicals), without due acknowledgement in the text.

Collusion is the presentation by a student of an assignment as his or her own work when it is, in fact, the result (in whole or in part) of unauthorised collaboration with another person or persons. Both the student presenting the assignment and the student(s) willingly supplying unauthorised material are considered participants in the act of academic misconduct.

More broadly, academic integrity is the value that the University of Melbourne values over all others. The penalties for all forms of cheating can, and sadly sometimes do, extend as far as expulsion from the University. Cheating almost always arises as an error of judgement made in a moment of stress. If you find yourself in such a situation just remember that the consequences of being caught cheating far outweigh any potential benefits, so please do not make that mistake.


5.7 Final Exam (70%)

The final exam accounts for 70 marks. Failure to achieve a mark of at least 35/70 on this exam will mean that the maximum attainable mark you can receive for the subject will be a pass mark of 50 with a grade of P.
All topics are examinable and there will be little covered in tutorials and assignments which will not be examined.

You will not be examined on what formulas or commands to use in Excel, but you may be examined on the interpretation of output generated in Excel.

5.8 Exam Policy
The Faculty requires that you are available for the entire examination period. Supplementary exams will not be provided in cases of absence during the examination period, unless the absence is due to serious illness or other serious circumstances. See the Special Consideration web-site for more information:

http://fbe.unimelb.edu.au/csc/assistance/special_consideration

The examination period for this semester is Tuesday 9 June to Friday 26 June.

5.9 Calculators
Only scientific calculators may be brought into the final exam. Any calculator or calculating device that has the capacity to store text or data (i.e. a graphing calculator, smart watch, etc.) will not be permitted. It is strongly recommended that you use the calculator you intend to use in the final exam throughout the semester.

5.10 Past Exams
Many students like to look at past exams for a subject as part of their revision process. Practice exam questions from previous semesters will be made available to you on the LMS from the start of the semester. The solutions to these questions however will not be released. Instead they will be discussed in the final couple of tutorials as well as the review lecture at the end of the semester.

6 Further Assistance
If you need assistance during the semester, you have several options:

6.1 Online Tutor
The Online Tutor allows you to direct questions to a tutor via the LMS. It can be accessed 24 hours a day, 7 days a week. The Online Tutor will attempt to answer your question within 24 hours (weekdays only).

To ensure that all students have a fair and equal opportunity to have their questions answered, questions relating to assessment (e.g. assignments and the final exam) submitted less than 24 hours before the assessment deadline will not be answered.

Your questions and the answers can (usually) be accessed by all students in the subject, allowing everyone to benefit from the question and answer. Importantly, your identity will not be revealed to other students. Notice that this means, that even if you don’t want to ask a question, you can still view existing questions and answers.

Note that the Online Tutor is not designed to replace attendance at tutorials or your own reading and preparation, but rather to complement these. If questions can be answered by referring to the prescribed readings then this will typically be the response. Please also note that detailed answers for assignments will not be provided by the Online Tutor. Solutions to assignments are provided elsewhere. If you do not understand concepts generally then please see your tutor during their consultation hours.
Finally, the Online Tutor will not answer duplicate questions. Please view existing questions and answers before posting a new question.

6.2 Tutor Consultations

All tutors will have a consultation hour available each week beginning in Week 3 of semester. Details will be placed on the LMS when they are available.

6.3 The Administrative Coordinator

For problems with general administration of the subject and with tutorials in particular, you should consult the subject’s Administrative Coordinator, Dr Wasana Karunarathne (contact details are on page 2 above).

7 Alternative Quantitative Requirements for the B.Comm.

There is an alternative set of subjects for satisfying the quantitative requirement for your commerce degree, which involve studying maths as your breadth component. If you are good at and enjoy mathematics, you should consider the mathematics pathway as an alternative to QM1 for satisfying the quantitative requirements of the BCom. Details of this pathway are as follows:

- Year 1, semester 1: Calculus 1 (Students who have achieved a study score of at least 27 in VCE Specialist Mathematics Units 3 and 4 can skip Calculus 1.)
- Year 1, semester 2: Linear Algebra and Calculus 2.
- Year 2, semester 1: Probability for Statistics
- Year 2, semester 2: Statistics

As well as satisfying the quantitative requirements for the BCom, these subjects can contribute to your breadth component.