UNSW Business School

School of Economics

COMM5005

Quantitative Methods for Business

Course Outline

Semester 1, 2017

Part A: Course-Specific Information

Please consult Part B for key information on Business School policies (including those on plagiarism and special consideration), student responsibilities and student support services.

Course website at: http://moodle.telt.unsw.edu.au

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1 STAFF CONTACT DETAILS

The **lecturer in charge** for this course is Mrs Judith Watson.
Judith will be available for consultation Monday 11:00 a.m.-12:00 noon and Thursday 3:00 p.m.- 5:00 p.m. or by appointment.
Office: Quad 3126 (located in the Western wing, third floor of the Quadrangle building above the UNSW bookshop).
Email: J.Watson@unsw.edu.au
Phone: 9385 3285

The tutors are Mr Gautam Gangopadhyay and Ms Gerthika Jegatheeswaran. Their contact details will be made available on the course website.

2 COURSE DETAILS

2.1 Teaching Times and Locations

In Weeks 1–12 you should attend a two-hour lecture on Thursday from 12:00–2:00 p.m. or Monday from 6:00–8:00 p.m. You should also attend a one-hour tutorial in Weeks 2-13.

For latest information about lecture and tutorial locations see:
http://www.timetable.unsw.edu.au/current/subjectSearch.html

2.2 Units of Credit

This course is worth six units of credit.

2.3 Summary of Course

This course provides an introduction to the basic mathematical and statistical tools needed in a business degree. There is an emphasis on problem solving by both manual and computer methods. In the first half of the course we focus on algebra and graphs, financial mathematics and optimisation methods including linear programming and calculus. The second half focuses on probability, descriptive and inferential statistics and analysing data.

2.4 Aims and Relationship to Other Courses

This course aims to enhance your ability to analyse financial and economic data and thereby to assist in making business decisions. It is one of the three data analysis core courses of the MCom program and is recommended for students in specialisations where quantitative skills are required. It is designed for those who have had little or no quantitative training in their undergraduate degree but who need mathematical and statistical skills for specialisations in the areas of Finance, Economics, Accounting and Business Strategy. Students of these disciplines who already have a good understanding of basic statistics may benefit from taking ECON5248 Business Forecasting as their core course. While the skills learned in COMM5005 are also relevant for other MCom specialisations, students from Marketing, Information Systems and Management disciplines will usually find COMM5011 Data Analysis for Business

more appropriate as their data analysis core course. That course has a lesser focus on mathematics and a greater focus on analysing textual data.

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items.
The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all postgraduate coursework students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree (e.g. 'be an effective team player'). You demonstrate this by achieving specific Program Learning Outcomes - what you are able to DO by the end of your degree (e.g. 'participate collaboratively in teams').

Business School Postgraduate Coursework Program Learning Goals and Outcomes

1. Knowledge: Our graduates will have current disciplinary or interdisciplinary knowledge applicable in local and global contexts.
You should be able to identify and apply current knowledge of disciplinary or interdisciplinary theory and professional practice to business in local and global environments.

2. Critical thinking and problem solving: Our graduates will have critical thinking and problem solving skills applicable to business and management practice or issues.
You should be able to identify, research and analyse complex issues and problems in business and/or management, and propose appropriate and well-justified solutions.

3. Communication: Our graduates will be effective communicators in professional contexts.
You should be able to:

a. Produce written documents that communicate complex disciplinary ideas and information effectively for the intended audience and purpose, and
b. Produce oral presentations that communicate complex disciplinary ideas and information effectively for the intended audience and purpose.

4. Teamwork: Our graduates will be effective team participants.
You should be able to participate collaboratively and responsibly in teams, and reflect on your own teamwork, and on the team's processes and ability to achieve outcomes.

5. Ethical, social and environmental responsibility: Our graduates will have a sound awareness of ethical, social, cultural and environmental implications of business issues and practice.
You should be able to:

a. Identify and assess ethical, environmental and/or sustainability considerations in business decision-making and practice, and
b. Consider social and cultural implications of business and /or management practice.

6. Leadership: Our graduates will have an understanding of effective leadership. (MBA and MBT programs only).
You should be able to reflect on your personal leadership experience, and on the capabilities necessary for leadership.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed (they may also be developed in tutorials and other activities):

Program Learning Goals and Outcomes		Course Learning Outcomes	Course Assessment Item
This course helps you to achieve the following learning goals for all Business School postgraduate coursework students:		*On successful completion of the course, you should be able to:*	*This learning outcome will be assessed in the following items:*
1	Knowledge	Solve problems using a variety of mathematical and statistical techniques relevant to a postgraduate business degree. Use a calculator and a spreadsheet program (Microsoft Excel) effectively to perform calculations.	• Assignment • Exams • Online activities
2	Critical thinking and problem solving	Engage in independent and reflective learning. Analyse business data and problems and apply critical thinking.	• Assignment • Exams • Online activities
3a	Written communication	Be familiar with relevant mathematical and statistical terminology (this may take more effort if you previously studied these subjects in a foreign language). Evaluate, draw conclusions and produce a business report.	• Exams • Assignment
3b	Oral communication	Participate in general and small group classroom discussions.	Not specifically assessed.
4	Teamwork	Work collaboratively to discuss and solve problems.	• Assignment (Part A)
5a.	Ethical, environmental and sustainability considerations	Identify ethical issues in business practice and statistical reporting.	Not specifically assessed.
5b.	Social and cultural awareness	Not specifically addressed in this course.	

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

This course aims to enhance your ability to analyse financial and economic data and thereby to assist in making business decisions. It also aims to prepare you for further MCom courses which require the use of numerical skills. Mathematical skills can only be acquired by sustained practice in problem solving. It is often some years since postgraduate students have used basic techniques so renewing “rusty” skills is an

important objective. You must learn to organise your independent study and practise a sufficient number of problems to gain a thorough understanding of concepts and how to apply them.

3.2 Learning Activities and Teaching Strategies

In this course you are expected to be an active learner rather than just sitting and listening in class. We are making lectures even more interactive by using the Active Learning Platform technology. Using this system you should participate by uploading data via your internet enabled device (**laptop, tablet or phone**). This will give you the opportunity to register your own individual input for quizzes, class example questions and opinions.

- Preparation for the lecture. Each week on Moodle you will find a list of key concepts that you need to revise or learn by reading the textbook, using online resources and/or working through examples.
- When you come to the lecture you may be asked to respond to questions that test your understanding of key concepts.
- During the lecture many examples will be demonstrated step-by-step and you will also be expected to attempt problems by yourself or in a small group. Make sure you bring a **scientific** calculator to do the calculations. Once your answers are uploaded you will be able to compare them to the answers of other members of the class.
- You will also be encouraged to ask questions and to give opinions.
- After seeing lecture examples you need to try more problems by yourself after class and to attempt the questions set for the following **tutorial**.
- In the tutorial you will actively work with a small group of students to compare your prepared answers and discuss solutions. The group will identify those problems which your tutor will need to explain in more detail.

It is difficult to succeed in this course without putting in regular effort and undertaking **out-of-class study**. In order to promote this, the assessment has a number of small tasks spread through the session. These are designed to give you good feedback to help you learn while attempting them. There are a number of online activities to promote regular learning. While the online quizzes allow you to learn from mistakes by allowing two attempts there are also a number of eLearning tutorials to help you prepare for assessments.

The **assignment** in this course will test your ability to analyse data, to use the Microsoft Excel program, and to think critically. Some knowledge of current events in business and research into the relevant local government areas of New South Wales will add to your understanding of the assignment material. It will be carried out in two phases. In the first part you will work with a team to research the topic and prepare materials for the second phase where you will work individually to analyse the data collected and write a report.

You will also need to develop good calculator skills in order to perform well in exams. Familiarity with the use of memories and built-in functions will increase your speed in solving problems. Students who have not practiced maths for some time can be quite slow in doing calculations and this can affect their exam results adversely.

The object of this course is not to memorise information. Therefore the mid-session test and final exam will have an open-book format. The focus of the assessment will be on your understanding of concepts, your ability to apply formulae appropriately, your problem solving and critical thinking.

4 ASSESSMENT

4.1 Formal Requirements

In order to pass this course, you must:

- achieve a composite mark of at least 50; and
- make a satisfactory attempt at ALL assessment tasks (see below).

4.2 Assessment Details

Assessment Task	**Weighting**	**Length**	**Due Date**
3 x Online Quizzes	4% each (12% total)	No time limit	Weeks 5, 9 and 13
5 x eLearning tutorials	Formative assessment 0%	No time limit	Available Weeks 2, 8, 11, 12, 13
Midsession Test Two problems on topics from Lectures 1–6	12%	30 minutes	During your normal tutorial time in Week 7
Assignment	Part A- 6% Part B-10%	Max 6 pages Max 8 pages including tables and graphs	Friday, Week 6 Wednesday, Week 10
Final Exam Problems on topics from Lectures 1–12	60%	2 hours	Exam period (June 9-26)

Make sure that you read Part B of this outline to understand the special consideration process which may apply if you are affected by illness or misadventure.

You also need to be aware of the policies on plagiarism in relation to submitting work that is your own. You will find information in Part B.

4.3 Online Quiz Format

The online quizzes can be accessed in the assessment section of the course website. They are designed to be used as learning tools as well as assessing your quantitative

skills development. They must be attempted by you without assistance. They will each be available for a one week period, beginning on Monday morning and finishing on Sunday night, so should be fitted easily into your work/study schedules. You will be allowed **two attempts** for each quiz and the higher of the two marks will be counted. You should be able to complete each attempt within 30 minutes.

You are encouraged to use the feedback from your first attempt to check the reasons for any mistakes. You should not expect to be given exactly the same questions on your second attempt, however further practice may be rewarded with improved marks. Research in a similar course has shown that, after controlling for other factors, final examination marks for the average student were higher when they had made an attempt on all online quizzes than when they had not.

Quiz dates:

1. Week 5: Monday March 27, 1.00 a.m. – Sunday April 2, 11.55 p.m.
2. Week 9: Monday May 1, 1.00 a.m. – Sunday May 7, 11.55 p.m.
3. Week 13: Monday May 29, 1:00 a.m. – Sunday June 4, 11:55 p.m.

Occasionally unscheduled shutdown periods may occur so try not to leave your attempts till the last minute.

The online quizzes will require input of calculated answers. Care should be taken to **avoid rounding errors** by keeping full numbers in memory and giving your answers to the required number of decimal places. For financial maths questions, a tolerance of five units of the least significant unit will be used i.e. if the correct answer is 1.234 answers between 1.229 and 1.239 will be accepted as being correct. In other questions a lower tolerance may be appropriate. Also when you enter an answer do not include symbols such as $.

4.4 eLearning Tutorials Format

Five online tutorials have been developed as a project in conjunction with the Adaptive eLearning Research group at UNSW (now operating as Smart Sparrow Pty Ltd). They will give you feedback to help you while you progress through a series of questions. The first two tutorials will assist you to make sure you are on the right track in graphing linear equations and later in using the graphical method for linear programming. The other three will check your use of normal tables and understanding of hypothesis tests and regression analysis output.
The tutorials will be scored with points deducted for each extra attempt you have at a question up to a reasonable limit. The maximum score for each tutorial will vary according to the number of questions and can be used by you as a measure of proficiency. The score is intended for your own use and will not be counted towards the course grade. Multiple attempts will be allowed during the period each tutorial is open.

The eLearning Tutorials will be available as follows:
Tutorial 1, during Week 2: Monday March 6, 1.00 a.m. – Sunday March 12, 11.55 p.m.
Tutorial 2, during Week 8: Monday April 24, 1.00 a.m. – Sunday April 30, 11.55 p.m.
Tutorial 3, during Week 11: Monday May 15, 1.00 a.m. – Sunday May 21, 11.55 p.m.
Tutorial 4, during Week 12: Monday May 22, 1.00 a.m. – Sunday May 28, 11.55 p.m.
Tutorial 5, during Week 13: Monday May 29, 1.00 a.m. – Sunday June 4, 11.55 p.m.
Apart from completing the tutorials within the designated weeks there is no other time limit and you may log-in more than once to complete the tutorial.

To access further information and the tutorials themselves you will need to go to the Assessment section of the course website.

4.5 Assignment Format

The assignment will test your ability to use statistical analysis and research to identify the best location for a new business. For Part A working in a small team you will collaborate to select relevant criteria, sources of information and data. Then working individually for Part B you will carry out statistical analysis using an Excel spreadsheet and use critical analysis to make recommendations. Your will be required to show good writing skills in your report and give a clear explanation of the results you obtain. Further information about the assignment will be posted on the course website. You should expect that it will require a sustained effort over most of the semester rather than a task that can be completed in a few days.

4.5.1 Late Submission

Unless approval for an extension is given on medical grounds (supported by a medical certificate) there will be a penalty of 1 mark per 24 hour period for late submission of assignments.

4.6 Midsession Test and Final Exam Format

The Midsession Test will consist of two problems with several parts covering topics from Lectures 1 – 6. The Final Exam will consist of a number of problems in several parts. It will cover both sections of the course from Lectures 1 – 12. Calculations will need to be shown for working.
Sample exams similar in format to these will be put up on course website. Students should note that, given changes in the course content, some questions from past exam papers for this subject may no longer be relevant. The test and exam will both be open book format.

4.7 Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will 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 will not be related to course grades.

5 COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's myExperience Survey Tool is one of the ways in which student evaluative feedback is gathered. You are strongly encouraged to take part in the feedback process. Feedback is also sought at the end of each eLearning Tutorials. This feedback from students has been used to make the questions clearer and to improve the hints provided for incorrect answers so please continue to contribute to this process.

6 COURSE RESOURCES

6.1 Books

There are **two required textbooks** for this course. For the first six lectures we use: Haeussler, E.F. Paul, R.S and Wood, R.J. 2013, *Introductory Mathematical Analysis for Business, Economics and the Life and Social Sciences* 13th ed., Pearson New International edition ISBN 9781292021140

Format	ISBN	Available to purchase from
Text Standalone	9781292021140	UNSW bookstore or http://www.pearson.com.au/9781292021140
PDF eText	9781292034386	http://www.pearson.com.au/9781292034386

This book is available in two versions with different covers. The New International edition (grey cover) contains the same material as the 13th ed. US version which has an orange and blue cover.

For the second half of the course we will use:
Berenson, M., Levine, D., Szabat, K., O'Brien, M., Jayne, N. and Watson, J., 2016, *Basic Business Statistics: Concepts and Applications*, 4th ed., Pearson Australia, Melbourne, Vic

Format	**ISBN**	**Available to Purchase From**
Text standalone	9781486018956	UNSW Bookstore
Text + MyMathLab and eText	9781488608834	UNSW Bookstore
eText+ MyMathLab	9781488614187	http://www.pearson.com.au/9781488614187
Downloadable eText	9781486019410	http://www.pearson.com.au/9781486019410
MyMathLab without eText	9781488696770	http://www.pearson.com.au/9781488696770

Some students may wish to purchase extra interactive content or other packages. See the Pearson website for more versions. Note that links to the student solutions manual and data sets will be available on the course materials section of the course website for download. More information will be made available on our course website in the course resources section. Please be aware that computers are not permitted in our open book exams so some material such as statistical tables might need to be printed if you choose an e-book.

Reference texts that should be available in the library are:

Swift, L. and Piff, S. 2014 *Quantitative Methods for Business, Management and Finance*, 4th ed Basingstoke: Palgrave Macmillan.

Tannous, K., Brown, R.L., Kopp, S., and Zima, P. 2013 *Mathematics of Finance* , McGraw-Hill Education (Australia), North Ryde.

6.2 Websites

The course **website** can be accessed at http://moodle.telt.unsw.edu.au. You will find that you are enrolled in three Moodle "courses" for COMM5005. The main website will contain most of the course information including the tutorial questions you need to prepare for each week. You should also check the website for assignment information, practice exam questions, data sources, online quizzes, eLearning Tutorials and other useful information.

The second Moodle "course" you will be enrolled in will be appropriate for your lecture group, Group A or B. It will display lecture slides prior to each lecture and allow you to join in activities and take notes during the lecture using the **Echo 360 Active Learning Platform**. After the lecture a recording will also be available so you can review any content you need. Note that an additional pdf version of the lecture slide handout will be made available on the main course website for those who prefer to print it out and to the lecture for writing notes on paper.

You have also been enrolled in a third Moodle website called **Figuring It Out (Maths/Stats)**. This site contains a large number of specially selected online resources for you to explore to revise basic concepts and increase your understanding of topics in COMM5005 and some additional related areas. You can make use of the statistics glossary to help understand terminology, the Lighting Up Statistics cartoon videos created at UNSW and many other resources which have been collected into ten maths and statistics categories.

6.3 PASS

For many years we have offered PASS, the Peer Assisted Support Scheme, for undergraduate students. PASS puts concepts into practice through workshops where pairs of leaders are available to help you review course materials and attempt problems. The emphasis is on active participation by students. Now the Business School is supporting PASS for postgraduates and we are able to offer two weekly PASS classes for COMM5005 students, which you can attend on a voluntary basis.

From **Week 3** we plan to run PASS at these times and locations:

Monday	3:00 p.m. - 4:00 p.m.	Bus G26
Wednesday	5:00 p.m. - 6:00.p.m.	Law 101

Before our face-to-face PASS sessions begin you can get revision help with sessions of **online PASS** being offered on two evenings per week. The Statistics session is 8:00-9:00 p.m. on Tuesdays beginning February 21. The Mathematics session is on Thursday 8:00-9:00 p.m. from February 23. These sessions will run up to Week 2. Check the Figuring It Out Moodle website for detailed information and the login.

6.4 Harvard Online Courses

The UNSW Australia Business School is making available to students a number of resources from Harvard Business Publishing. In COMM5005 we will have two online learning modules available for you to use as additional resources. These are Mathematics for Management and Quantitative Methods. Each section consists of a pre-test which you can try, material from various topics arranged in a number of screens with practice exercises and a final test. You can start working through these at your own pace prior to the commencement of session to give yourself a good preparation. Note that the tests are purely for practice purposes and marks for them will not count towards your assessment in COMM5005. For a link to register for the

Harvard material and more information about other resources see the Course materials section of the website.

6.5 Calculator

A basic scientific calculator is required for this course and it must be approved for use in exams. It must be able to perform logarithmic and exponential calculations such as *ln x*, e^x and x^y. The calculator must not be a programmable one (i.e. should not have an alpha-numeric keypad) or have a graphic display. It should not be capable of storing or solving equations, differentiation or factoring. For a list of **approved calculators** see https://student.unsw.edu.au/exam-approved-calculators-and-computers

You should take the calculator to the Business School Student Centre to have the approval sticker attached. If you need to purchase a new calculator, keep in mind that it will be desirable to have a two variable statistical mode to perform linear regression (LR) calculations.

6.6 Computer and Software

For lectures you will need to bring a laptop, preferably, or a tablet or phone which has an internet connection in order to fully participate. For homework and your assignment you will need to use a computer with the Microsoft Excel program installed. On a Windows machine make sure that you have the version that enables Analysis Toolpak Add-ins to be used. On a Mac, check that the version of Excel program has the statistical capability you require. Earlier versions and may need to be supplemented by another program such as StatPlus or PhStat or Wizard.

7 COURSE SCHEDULE

Note: As the text/ reference book titles are long readings are shown either using:
HPW to denote Haeussler, Paul and Wood
TBKZ to denote Tannous, Brown, Kopp and Zima
SP to denote Swift and Piff
Ber to denote Berenson et al.

Week	Date	Topic	Learning Objective	Textbook Reading
	Part 1- Making Business Decisions (Mathematical topics)			
1	27 Feb/2 Mar	Introduction + Describing the problem	Learn how to represent a business problem in terms of graphical and functional relationships.	HPW 2.1-2.2, 2.5, 2.8, 3.1-3.3, 4.1-4.3
2	6/9 Mar	Possible answers	Learn to represent business problems in terms of equations, solve them and interpret solutions.	HPW 0.7-0.8, 1.1-1.3, 3.4, 3.6, 4.4
3	13/16 Mar	Valuing alternatives	Learn to value costs and benefits occurring at different times, evaluate rates of return on alternative projects and work with annuities.	HPW 5.1-5.4 TBKZ 1.3-3.3 and 7.1-7.2
4	20/23 Mar	Calculating for loans and savings	Learn to calculate the payments required to repay a loan as interest rates change. See how savings payments are affected by rate changes.	HPW 5.4-5.6 TBKZ 3.4, 4.3 5.1-5.3
5	27/30 Mar	Considering changes	Learn to use calculus to examine inter-relationships between factors that influence the business environment.	HPW Ch 11, 12.1-2.3,12.5, 17.1-17.3
6	3/6 Apr	The best solution	Learn how to use graphical and calculus techniques to solve optimisation problems.	HPW 12.7, 13.1-13.6, 7.1-7.3 SP pp.550-566
	Part 2 – Interpreting Business Data (Statistical topics)			
7	10/13 Apr	Describing the data	Learn to present data in frequency tables and graphs and to calculate and interpret summary statistics.	Ber 2.1-2.6, 3.1-3.6 SP pp.537-539
Mid-semester break: Friday 14 – Saturday 22 April inclusive				
8	24/27 Apr	Probability and expectation	Learn to describe business environments that involve uncertainty and risk.	Ber 4.1-5.3 + Table E6

				HPW Ch8, 9.1-9.2
9	1/4 May	Evaluating parameters	Learn to calculate normal probabilities and use them to make statistical estimates with a given degree of confidence.	Ber 6.1-6.4, 7.1-7.3 + Table E2
10	8/11 May	More estimation + Testing hypotheses	Estimate with unknown variance. Learn to use statistical techniques to evaluate the likelihood of some statement about a financial or economic relationship being true	Ber 8.1-8.4, 9.1-9.5, 9.7 + Table E3
11	15/18 May	Estimating regression parameters	Learn to estimate unknown parameters in key financial and economic relationships using regression techniques.	Ber 12.1-12.5, 12.9
12	22/25 May	Forecasting the future	Learn the use of statistically based models to forecast the values of particular variables in an economic or financial relationship	Ber 12.7,13.1-13.4, 13.6, 14.1-14.4, 14.8-14.9 + Table E5