ECON1202
Quantitative Analysis

Course Outline
Summer School, 2016/2017

Part A: Course-Specific Information

Students are also expected to have read and be familiar with Part B Supplement to All Course Outlines. This contains key information on Business School policies (including those on plagiarism and special consideration), student responsibilities and student support services.
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1 STAFF CONTACT DETAILS

Course Co-ordinator: Johannes Hoelzemann
Email: j.hoelzemann@unsw.edu.au

1.1 Communications with staff
The Course Co-ordinator is responsible for the overall direction and academic content of the course.

The Course Co-ordinator should be contacted by email in the case of administrative queries. All course content queries should be raised through the Moodle interface or during Blackboard Collaborate sessions.

2 COURSE DETAILS

2.1 Course Content
This is an online course, taught in 6 units corresponding to the six weeks of the semester starting 5 December, 2016.

2.2 Units of Credit
The course is worth 6 units of credit.

2.3 Summary of Course
Mathematics is an important part of theoretical and applied analysis in economics and business. This course equips students with a working knowledge of the most common techniques, providing the basis for their further studies. Topics include the mathematics of finance, matrix algebra, linear programming, as well as calculus and (unconstrained and constrained) optimisation. Special emphasis is put on the illustration of the covered concepts and techniques with applications to typical problems in business and economics.

2.4 Presumed Knowledge
This course assumes a level of knowledge in mathematics equivalent to HSC Mathematics. If you have not studied HSC mathematics in New South Wales, remedial work might be necessary. Knowledge of the following topics is essential: basic functions and graphs, including logarithms and exponentials, and solutions of linear and quadratic equations.

Students also need to practice in their own time using Excel, which is the environment in which most problems will be worked through. There will not be any official training or class for Excel as part of the course.

It should be emphasized that this is an online course. A proper internet connection and reliable internet access are essential throughout the course. Students with slow or intermittent internet connections are encouraged not to enrol. No special consideration will be granted for internet problems, including the inability to upload files in a timely manner.

2.5 Aims and Relationship to Other Courses
This course is offered as part of the first year core in the Bachelor of Economics degree. For students who commenced the Bachelor of Commerce program in 2009 or
prior years it is one of the six 1st year core courses. For students starting the BCom program in 2010, it is not part of the 1st year core, but it is a prerequisite for most 2nd year economics courses, so it is strongly recommended for those contemplating one of the economics majors.

The course aims to give students insight and understanding about how mathematical concepts, theories and techniques are applied to the fields of business, economics and the social sciences in order to generate solutions to problems encountered in these fields. In this course we build on the mathematical knowledge which you should have gained in high school. The course content constitutes the minimum mathematical knowledge and skills that graduates from the Faculty should possess in order to be effective in their later studies at UNSW, and in the world of work.

After completing QABE, your use of mathematics and statistics in your studies will vary depending on the major(s) you choose. If you choose majors such as Economics, Business Economics, Financial Economics, and/or Econometrics, you will study further courses in econometrics. These majors are designed to equip students with statistical and other quantitative skills that are widely used and increasingly demanded by employers in commercial fields and the public sector. If you choose other majors where quantitative skills are needed, such as Accounting, Finance and Marketing, a good understanding of concepts taught in QABE will be a major asset.

The aims of this course are for you to:
- Gain experience in activities of value to every business person, such as problem solving and using a spreadsheet;
- Develop your ability to perform calculations;
- Develop your ability to solve real-life business problems using formal mathematical tools and algorithms;
- Extend your skills in analysis and in oral and written communication.

2.6 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 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. For more information on the Undergraduate Program Learning Goals and Outcomes, see Part B of the course outline.

The following table shows how your Course Learning Outcomes relate to overall Program Learning Goals and Outcomes, and where these are assessed:

<table>
<thead>
<tr>
<th>Program Learning Goals and Outcomes</th>
<th>Course Learning Outcomes</th>
<th>Course Assessment Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course helps you to achieve the following learning goals</td>
<td>On successful completion of the course, you should be able to:</td>
<td>This learning outcome will be assessed in the following items:</td>
</tr>
</tbody>
</table>
| Knowledge | Apply basic principles of financial mathematics to real life problems. Apply probability tools to solve risk and uncertainty scenarios. Use matrix algebra to represent and solve systems of equations. Use linear programming and calculus to solve optimisation problems. | • Tutorial problems  
• Online quizzes  
• Exam |
Apply both single variable and multivariable calculus to business and economics problems. Use Excel spreadsheet proficiently to analyse data and make correct interpretations of the program’s output.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Critical thinking and problem solving</td>
<td>Formulate and solve real problems amenable to mathematical analysis that arise in economics and business using the methods appropriate to the problem.</td>
</tr>
<tr>
<td>3a</td>
<td>Written communication</td>
<td>Construct written work which is logically and professionally presented.</td>
</tr>
<tr>
<td>3b</td>
<td>Oral communication</td>
<td>Communicate successfully with group members in solving analytical problems. Such skills in analytical thinking and effective communication are Graduate Attributes that UNSW seeks to foster in its graduates.</td>
</tr>
<tr>
<td>4</td>
<td>Teamwork</td>
<td>Work collaboratively to complete a task.</td>
</tr>
<tr>
<td>5a</td>
<td>Ethical, environmental and sustainability considerations</td>
<td>Identify and assess environmental and sustainability considerations in problems in economics and business.</td>
</tr>
<tr>
<td>5b</td>
<td>Social and cultural awareness</td>
<td>Not applicable in this course.</td>
</tr>
</tbody>
</table>

### 3 LEARNING AND TEACHING ACTIVITIES

#### 3.1 Approach to Learning and Teaching in the Course

The philosophy underpinning this course and its Teaching and Learning Strategies are based on “Guidelines on Learning that Inform Teaching at UNSW. These guidelines may be viewed at: [www.guidelinesonlearning.unsw.edu.au](http://www.guidelinesonlearning.unsw.edu.au). Specifically, the content and assessments have been designed to appropriately challenge students and support the achievement of the desired learning outcomes. A climate of inquiry and discussion is encouraged between students and teachers and among students. The lecturer-in-charge aims to provide meaningful and timely feedback to students to help improve learning outcomes.

This is not a course where you can expect to perform well just by passively observing. You will need to be actively involved in your learning: evaluating information, asking and answering questions. You also must learn to organise your independent study and practice enough problems to gain a thorough understanding of concepts and how to apply them. You are expected to:

- put a consistent effort into both online and offline learning activities throughout the session;
- develop communication skills through engaging in online activities and preparing your assignments;
- concentrate on understanding how and why to use formulas and less on memorising them;
- make continuous improvements by using the feedback you are given on your assignments.
3.2 Learning Activities and Teaching Strategies

The examinable content of the course is defined by the textbook chapters referred to in the course schedule below; the content of the lecture slides; the content of the tutorial program; and the content of the recorded Blackboard Collaborate sessions.

**Offline learning**

You are expected to read assigned chapters in the text and to review lecture slides (and recorded lectures, if desired) each week, as we move through each topic. To get the most out of your online learning time, you are advised to work through the relevant lecture material and textbook chapters assigned for a given week prior to joining a Blackboard Collaborate session that week. Links to all materials required for offline learning, with the exception of the text itself, will be provided through the Moodle site.

The purpose of your offline learning is to provide a logical structure for the topics that make up the course; to develop a basic grasp of the important concepts and methods of each topic; and to start engaging with relevant examples to which the concepts and methods are applied.

**Online learning**

A three-hour Blackboard Collaborate session will be held each week of the session, in which the lecture and computing material for that week will be worked through interactively. These sessions are designed to help students deepen their conceptual understanding and to practice applying the material. Blackboard Collaborate sessions also provide students the opportunity to ask specific questions about the material covered in lecture slides and in the text. The sessions will be recorded for future revision by students and they are scheduled for the following Sydney local times:

**WEEK 1**

*Lecture*: Tuesday, 6 December: 1:00 – 4:00 PM

**WEEK 2**

*Lecture*: Tuesday, 13 December: 1:00 – 4:00 PM

**WEEK 3**

*Lecture*: Tuesday, 3 January: 1:00 – 4:00 PM

**WEEK 4**

*Lecture*: Tuesday, 10 January: 1:00 – 4:00 PM

**WEEK 5**

*Lecture*: Tuesday, 17 January: 1:00 – 4:00 PM

**WEEK 6**

*Lecture*: Tuesday, 24 January: 1:00 – 4:00 PM

Each week, a one-hour video covering tutorial exercises for that week as well as a one-hour video providing additional study material will be made available.

In addition, you are expected (for course credit) to visit MyMathLab at some point each week and complete an assigned set of questions on that week’s topics.

Finally, you may find other resources provided on the Moodle site to be of use, including links to recorded lectures from previous offerings of ECON 1202, and links to other online question sets and learning support.
General Strategy

An “ideal” weekly study strategy (on which the provision of course materials is based) might look like the following:

1. Read the relevant chapter(s) of the text after going through the lecture slides (and the recorded lectures, if desired). Complete your reading and review by the middle of the week.
2. Briefly review the tutorial questions (available via Moodle) on your own. This helps you to identify issues that need to be clarified or resolved. You might need to go back to the textbook or lecture slides for more clarification.
3. Visit MyMathLab and attempt the questions assigned for that week’s topics.
4. Join a Bb Collaborate session to cement your understanding and practice applying the material. Participate in other online activities via Moodle if desired.
5. (if desired) Revisit MyMathLab and make a second attempt at the questions assigned for that week’s topics.
6. (if applicable) Complete and upload the assignment for that week.

4 ASSESSMENT

4.1 Formal Requirements

In order to pass this course, you must:
- achieve a composite mark of at least 50 (out of 100); and
- make a satisfactory attempt at all the assessment tasks; and
- achieve a minimum score of 50% for the final exam

STUDENTS MUST PASS THE FINAL EXAM IN ORDER TO PASS THIS COURSE.

4.2 Assessment Details

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Weighting %</th>
<th>Learning Outcomes assessed</th>
<th>Length</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Quiz 1</td>
<td>5%</td>
<td>1,2,3,4</td>
<td>10 questions</td>
<td>Week 2</td>
</tr>
<tr>
<td>Online Quiz 2</td>
<td>5%</td>
<td>1,2,3,4</td>
<td>10 questions</td>
<td>Week 3</td>
</tr>
<tr>
<td>Online Quiz 3</td>
<td>5%</td>
<td>1,2,3,4</td>
<td>10 questions</td>
<td>Week 5</td>
</tr>
<tr>
<td>Online Quiz 4</td>
<td>5%</td>
<td>1,2,3,4</td>
<td>10 questions</td>
<td>Week 6</td>
</tr>
<tr>
<td>Completion of MyMathLab questions</td>
<td>10%</td>
<td>1,2,3,4</td>
<td>See details below</td>
<td>By 5 PM Sydney time, Friday, 27th January</td>
</tr>
<tr>
<td>Final exam</td>
<td>70%</td>
<td>1,2,3,4</td>
<td>2 hours</td>
<td>University Exam Period</td>
</tr>
<tr>
<td>Online participation BONUS MARKS</td>
<td>Up to 5 marks</td>
<td>1,2,3,4</td>
<td>N/A</td>
<td>Optional; see below</td>
</tr>
</tbody>
</table>

4.3 Online Quizzes

Four online quizzes have been designed to assist you to learn, so you can practice, check your understanding of topics and improve on your first attempt if necessary. Each quiz will count towards 5% of the overall mark for the course.
The first three quizzes will test material up to and including that covered in the previous week; the final quiz will test material up to and including that covered in the final week. Before completing each quiz, you will have the opportunity to try online self-check practice questions that are similar in content to the topics to be examined. For each quiz you are allowed two attempts, but only your highest mark on each quiz will be recorded.

Each of the online quizzes will consist of ten questions requiring you to perform calculations and enter numerical answers. In order to avoid rounding errors, you should try to store as much information as possible in your calculator’s memory. You will be allocated a time limit of one hour to complete each of your two attempts. On your second attempt, you may not get exactly the same set of questions or data as you did on your first attempt.

The dates between which quizzes (and practice questions) will be available online are:

Quiz 1 – Week 2: Monday 12/12/16 – Sunday 18/12/16
Quiz 2 – Week 3: Tuesday 3/1/17 – Monday 9/1/17
Quiz 3 – Week 5: Monday 16/1/17 – Sunday 22/1/17
Quiz 4 – Week 6: Monday 23/1/17 – Sunday 29/1/17

You can access the quizzes through a link available on the Moodle website.

It is a good idea to save each answer as you progress through the questions in case your internet connection fails. Do not leave it until Sunday night to begin your first quiz attempt, as overuse of the website may cause access problems.

There are no supplementary quizzes. You are given two attempts partly in order to allow for any unforeseen technical problems that may cause you to lose one attempt. You may contact the lecturer-in-charge if and only if you lose both of your attempts due to system-related technical problems encountered in a UNSW computer lab. No consideration will be given if you delay your two attempts until Sunday evening.

4.4 MyMathLab Questions

Each week’s topics will be addressed in a selection of questions on MyMathLab (linked to the textbook). You are encouraged to attempt these questions each week. Students who make genuine attempts at the MyMathLab question sets for each topic and get more than 75% of the questions correct by their final attempt will earn 10 marks towards their course grade. Students who do not make a genuine attempt at each week’s MyMathLab questions or who get fewer than 75% of the questions correct by their final attempt will be awarded either 5 marks or nothing, depending on their level of effort and engagement in attempting the questions.

4.5 Assignment Submission Procedure

Records of each student’s attempts at and performance on the online quizzes and the MyMathLab questions are retained by the system across the entire session. A comprehensive set of these records will be forwarded to the lecturer-in-charge for purposes of calculating course marks at 5 PM Sydney time on Sunday, January 29. All MyMathLab resources will continue to be available until the final exam.

4.6 Late Submission of Assignments

There is a deadline for submission of each piece of assessment in this course. Late submission will be considered only in extreme circumstances. Any student who for reasons of serious illness or misadventure cannot submit before the submission
date, will need **full and convincing documentation of that illness or misadventure**, such as a valid medical certificate which covers the period extending from 4 days prior to the submission deadline, until that deadline. In cases where students have applied for special consideration, work must still be submitted within five days of the submission date or it will not be marked.

Applications for special consideration for late submission must be drawn to the attention of the lecturer-in-charge within 3 days of the submission date.

Special consideration will only allow a waiver of **part** of the late penalty: up to one day’s penalty may be waived for each two days of documented illness or misadventure. Satisfactory performance in the course to that point will be taken into account by the lecturer-in-charge in deciding whether to approve an application for consideration.

Employment obligations or holiday plans of any kind are not acceptable reasons for tardiness in completing assignments.

Applications for special consideration must be **lodged online through myUNSW within 3 working days of the assessment** (Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration). Then submit the originals or certified copies of your supporting documentation and a completed **Professional Authority form (pdf - download here)** to Student Central.

### 4.7 Final Exam Format

The final exam, to be held on campus at UNSW, will cover the examinable material of the entire course. The exam will last for 2 hours and will feature a mix of multiple-choice and multi-part written questions.

Be aware that the final exam counts for **seventy percent** of your final mark in this course, and that you **must pass the final exam** in order to pass the course.

### 4.8 Participation Bonus

To encourage online discussion and interaction, a participation bonus is available for students who make a positive contribution to the online presence of this course. Students may receive up to a total of 5 bonus marks for active online participation. To receive these bonus marks students are expected to write a short blog post by the end of each week on real-world examples of the discussed topics during lecture time. These marks will be added directly to their final exam mark. In principle, these marks are available to every student: there is no pre-set maximum fraction of the class who will be selected to receive them.

### 4.9 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.
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.

6 COURSE RESOURCES

The website for this course is on UNSW Moodle at: http://moodle.telt.unsw.edu.au

The Moodle site provides access to announcements, links to Blackboard Collaborate, facilities for uploading assignments, softcopies of course-specific files uploaded by staff (including this course outline), and other resources including YouTube videos, and Harvard Business Publishing materials relevant to the course.

The textbook for this course is:

The text is referred to in the Lecture Schedule below as ‘HPW’. The text and (optional) student solution manual, which contains solutions to the odd numbered questions, are both available at the UNSW bookshop and in the High Use Collection in the library.

Students may also find the following books useful for some parts of the course:

<table>
<thead>
<tr>
<th>Supplementary Texts</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown, R.L., S. Kopp, and P. Zima, Mathematics of Finance, 7th ed, Published by McGraw-Hill, 2011.</td>
<td>This book is highly recommended additional reading for topics covered in the <strong>first week</strong> of the course. Selected sections (indicated in <em>italics</em> in the Course Schedule below) are available electronically through the UNSW library, and the entire book is also held in the High Use Collection and at the UNSW Bookshop.</td>
</tr>
<tr>
<td>Watson, J., Managing Mathematics: A Refresher Course for Economics and Commerce Students, 2nd ed., School of Economics, UNSW, 2002.</td>
<td>Recommended for those who have previously gained the assumed knowledge of mathematics, but who now need to refresh algebra or calculus. Available in the High Use Collection.</td>
</tr>
</tbody>
</table>

*Calculator.* A basic scientific calculator is required for this course. Usually the calculator you used at school will be satisfactory. It must be able to perform logarithmic and exponential calculations such as ln \(x\) and exp(\(xy\)). The calculator must not be a programmable one (i.e., it should not have a full alphabetic keyboard) or a financial one. If you need to purchase a new calculator, keep in mind that for further use, it will be desirable to have a two-variable statistical mode available for performing linear regression calculations.
Software. If you wish to complete the computing requirements of this course using your own computer rather than the university laboratories you will need to have the Microsoft Excel program installed. Make sure that you install the full version of Excel that enables add-ins to be used.

7 COURSE SCHEDULE
The formal teaching periods are from 5th – 16th December 2016 and 3rd – 27th January 2017, but assistance will continue to be available during the 'study period' of 30th January – 3rd February 2017.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture/Material</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1    | 5 Dec 2016 | Lectures 1 to 4 HPW 5.1-5.3 Brown et al. 1.1, 1.2, 1.4, 2.3, 2.4, 2.6, 3.1, 3.4, 8.1, 8.2, and Appendix 2 | - Introduction to functions  
- Time value of money  
- Geometric progressions and annuities  |
| 2    | 12 Dec 2016 | Lectures 5 to 8 HPW 6.1-6.3, 6.6, 8.2, p. 360-362 | - Introduction to matrices and matrix algebra  
- Permutations and combinations  |
|      |         | **Christmas shutdown:** 21 Dec 2016 - 2 Jan 2017 |                                                                            |
|      |         | **Teaching recess:** 17 Dec 2016 - 2 Jan 2017 |                                                                            |
| 3    | 3 Jan 2017 | Lectures 9 to 12 HPW 8.5-8.7, 9.3, 7.1-7.3 | - Probability  
- Markov chains  
- Introduction to linear programming  |
- Differentiation  
- Optimization in one variable  |
| 5    | 16 Jan 2016 | Lectures 17 to 19 HPW 14.1-14.7, 14.9, 15.5-15.6 | - Integrals  
- Differential equations  |
| 6    | 23 Jan 2016 | Lectures 20 to 22 HPW 2.8, 17.1-17.7 | - Multivariate calculus and partial derivatives  
- Multivariable and constrained optimization with applications  |