SCHOOL OF ECONOMICS

Subject Outline – Autumn Session 2007

Wollongong Campus
6 credit points

ECON 222:
QUANTITATIVE METHODS II

WELCOME TO ECON 222!

I hope that you will find this subject interesting, challenging, and rewarding!!

LECTURE TIMES:

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<th>DAY</th>
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<th>Room</th>
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<tr>
<td>Monday</td>
<td>12:30 – 13:30</td>
<td>20.3</td>
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<tr>
<td>Friday</td>
<td>11:30 – 13:30</td>
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LECTURER

Dr. Eduardo Pol [Subject Coordinator]
Room: 40.215
Phone: (02) 4221 4025
e-mail: epol@uow.edu.au

CONSULTATION TIMES

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Or by appointment

PLEASE RETAIN THIS DOCUMENT FOR FUTURE REFERENCE
Please, read this document from cover to cover at least twice.

Contents

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2. Brief Outline of the Subject
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1. WHY IS QM2 IMPORTANT?

A feature distinguishing economics from other social sciences is its concern with quantifiable variables (such as prices, costs, outputs, and profits) and their graphical representation.

Quantitative analysis is applicable in business and economics and can be called into service when convenient. Quantitative Methods II concentrates on mathematical methods useful in the world of business and economics.

The Importance of Mathematics

The importance of mathematics to business and economics stems from its usefulness in developing economic intuitions or assumptions. More precisely, mathematics is useful for translating verbal language into precise and compact forms, and for deriving conclusions from the assumptions. Also, the rigorous development of economic ideas can itself suggest new ones, and therefore, mathematics has a creative role to play in economics.

Mathematics is also important as a problem-solving tool. Problem-solving activities are an integral part of QM2.

The Role of Mathematics

It should be emphasized, however, that mathematics is not an end in itself, but rather a set of tools which facilitates the exposition and development of economic ideas. Or, to put it differently, mathematics is the servant of business and economics, not the master.

As will become apparent during the session, the typical mathematics used in this subject is not really difficult to learn and understand.

2. BRIEF OUTLINE OF THE SUBJECT

QM2 provides an introduction to mathematical techniques useful in business and economics. The main topics include, but are not limited to, marginal values, average values, elasticities, constrained and unconstrained optimization, game theory, and mathematics of finance.

- The basic tools will be systematically presented and clearly illustrated in representative business and economic models.
- Advanced mathematical concepts will be simplified.
3. PEDAGOGICAL STRATEGY

The pedagogical strategy can be described by a two-term sequence:

- **first**, the necessary **technicalities** will be explained to develop **self-confidence**, and
- **then**, the mathematical tools will be **applied** to basic economic problems.

Specifically, my strategy will be to build up the mathematical tool kit **gradually**, step by step, with the elementary tools serving as stepping stones to the more advanced tools discussed later. Armed with these weapons we will analyze archetypal economic concepts and problems.

4. STUDENT LEARNING OUTCOMES

In the present course we will introduce some (mostly elementary) mathematical techniques that are useful in the world of business and economics. The aims of this course are to

- make those techniques and their applications accessible and understandable to **all** students, and
- develop your **skills in problem-solving activities**.

Students will be involved in a systematic process of learning by doing through problem-solving activities, including random mini-tests in tutorials, mid-session test, and final examination.

Successful completion of this subject will endow you with an **‘intellectual comparative advantage’**. In fact, you will be able to

- **formulate** economic and business problems in mathematical terms;
- **solve** economic and business problems; and
- **translate** the mathematical presentation of economic ideas into the colloquial language.

Specifically, students who complete this subject successfully will

- have a clear idea of the use of mathematics in business and economics;
- understand and be able to explain the concept of a derivative (both ordinary and partial derivatives);
- know how to systematically compute constrained and unconstrained maxima and minima;
- know how to use optimization methods to maximize profits;
- know and be able to apply many mathematical techniques to business and economic problems, including the chain rule and present value;
- know how to use constrained optimization techniques to gain a deep understanding of the problems of cost minimization and utility maximization;
have a clear idea of the mathematics of game theory with the corresponding
applications to oligopolistic behaviour; and
possess a working knowledge of linear algebra and its applications to input-output
analysis.

5. WORKLOAD

Organizing your ECON 222 activities is a very important decision. It is not one to be
taken lightly.

You have to design a timetable

and rigidly stick to it.

ECON 222 is a 6 credit point subject. This means that in addition to the three hours of
lectures and the one hour tutorial, you should plan to spend

8 hours (on average) per week

seriously working on QM2. This time should be spent overviewing lecture material and
completing tutorial quizzes.

The above mentioned workload is consistent with the complexities of the subject and will
give you enough time to understand the course content.

Beyond any doubt, to study QM2 on a regular basis will pay high dividends at the time of both the Mid-session
Test and the Final Examination.

6. WORKBOOK AND RECOMMENDED TEXTBOOK

QM2 Workbook (Prescribed)

Eduardo Pol, QM2 Workbook, February 2004, $50 approximately (available in the
Unibookshop). Please note that this is a limited edition and there will not be a reprint. Please, bring the QM2 Workbook every lecture: we will use the Workbook intensively in
class.

Textbook (Recommended)

The recommended textbook, referred to as Haeussler & Paul (2002), contains 19 chapters, but only 7 chapters will be used in QM2.

There are several important topics in the QM2 Workbook which cannot be found in the recommended textbook. These include, but they are not limited to, game theory, the economic interpretation of the second-order partial derivatives, and the second-order conditions for constrained optimization.

Note, in particular, that there are several chapters in Haeussler & Paul (2002) devoted to probability and other statistical problems. These chapters are not relevant for QM2.

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Other Useful (but more advanced) Textbooks


7. LECTURE TOPICS

All the lecture topics are covered by the QM2 Workbook.

The lecture topics include economic applications of

- ordinary derivatives: marginal values, average values, and elasticities; 12 and 13
- maxima and minima of functions of one variable; 14 and 15
- partial derivatives: marginal products and output elasticities; 19
- unconstrained optimization: profit maximization; 19
- game theory;

- level lines and related topics: the shape of an isoquant and the cross-partial s of the production function; ← Not in Haeussler & Paul (2002)
- second-order conditions, constrained utility maximization, constrained cost minimization 19 ← Not in Haeussler & Paul (2002)
- linear algebra and input-output analysis; 6
- mathematics of finance 8
8. PRIOR KNOWLEDGE

We assume that you have a sound understanding of elementary algebra and basic calculus as is contained in 2 Units Maths, or the equivalent. Students who need algebra and geometry refresher should have a look at chapters 0, 1, 2, 3, 4, and 5 of Haeussler & Paul (2002).

We also assume that you have a sound understanding of ECON 111: Introductory Microeconomics.

9. ASSESSMENT

There are four components of assessment dispersed as follows:

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<tr>
<th>Component</th>
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<tr>
<td>Tutorial Participation</td>
<td>5</td>
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<tr>
<td>Quizzes</td>
<td>28</td>
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<tr>
<td>Mid-session Test</td>
<td>27</td>
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<tr>
<td>Final Examination</td>
<td>40</td>
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100

Minimum acceptable performance to pass the subject

- To pass this subject, students must obtain at least 40% in each component of assessment. This implies that students are required to achieve at least 40% in the Final Examination to pass the subject.

- Students are required to achieve at least 50% in the Final Examination to obtain a credit grade or better in ECON 222.

10. CHEATING: ZERO TOLERANCE

During a test period, students can only have the materials necessary to write the test on their desk-top. All other material must be placed in your bags, and not let at your feet or near the desk.

Any student attempting to cheat in the test will be referred to the School’s Primary Investigation Officer under the University’s Rules for Student Conduct and Discipline.

The Primary Investigation Officer will then hold a meeting with the student, tutor and subject coordinator. Serious penalties can be applied.

The University has a zero tolerance toward cheating, even for small tests that may only represent a small proportion of the total assessment.
11. TUTORIAL PARTICIPATION (5% of the Total Assessment)

The requirement for students to participate in tutorials –as part of the tutorial process- has many educational virtues. These include the incentive to work actively, the need to apply general ideas to specific problems, and feedback to staff on areas with which the students are having problems.

The basis of the individual assessment will be the interest shown by a student in attempting the answers to the short quizzes. Preparation of tutorial answers and involvement in discussing the answers are essential indicators of ‘interest’.

Tutorial activities in this subject will encourage you to keep up your preparation and will give you regular feedback on your progress.

A roll will be kept by tutors. Your tutorial attendance will be recorded each tutorial.

12. QUIZZES (28% of the Total Assessment)

Quizzes (or tutorial questions) are very important to articulate your knowledge and gain better understanding of course material. The pedagogical reason for them is that students often fail to learn from reading because they are not immediately challenged to test their understanding of what they have read. In addition, the tutorial quizzes aim at developing your skills in problem-solving activities.

**Philosophy**

The philosophy underlying the quizzes is best condensed in the following proverb: I hear and I forget, I see and I remember, I do and I understand!

**Purpose**

It is virtually impossible to absorb all the material to be presented in this subject just a couple of days before the date of the Mid-session Test or the Final Examination.

Normally, the 6 quizzes allocated to a particular week are based on the lecture topics developed in the week immediately before. The main purpose of the tutorial quizzes is to induce you to study QM2 every week.

**Mechanics**

The mechanics of the short quizzes is as follows.

- Quizzes (of 20 minutes duration) will be held in seven of the 12 tutorials.

- In each of the seven tutorials, one of the six assigned quizzes will be completed under test conditions.
• The tutorials in which the quizzes are to be conducted will be randomly
distributed across the weeks of the session of each tutorial class. Or, to put it
differently, students will not be told in advance which week the quiz will be held in.

The only exception is Tutorial 3 where there will be a test with certainty.

• The particular question to be tested will be drawn at random by the tutor in the
presence of the tutorial group.

• More precisely, in the event that a tutorial quiz is given, the tutor will throw a
die in the presence of the tutorial group to select the quiz to be answered.

• The number of spots on the uppermost face will indicate the number of the
quiz to be answered.

• Students must do their quizzes in their assigned tutorial classes. Quizzes
completed in other tutorial classes will not be taken into account.

**Incentive**

The allocation of marks to tutorial quizzes is as follows.

• Tutorials 1 and 2: each quiz will be graded out of 2 marks. ➞ Random Quizzes

• Tutorial 3: each quiz will be graded out of 4 marks. ➞ Certain test

• Tutorials 4, 5, 6, and 7: each quiz will be graded out of 2 marks. ➞ Random Quizzes

• Tutorials 8 to 12: each quiz will be graded out of 8 marks. ➞ Random Quizzes ➞ Note the drastic increase
  in the number of marks

It is hardly necessary to mention that the incentive provided by the tutorial quizzes is
significant.

**Catch-up quiz**

Students who have taken four or less quizzes will be eligible to take a ‘catch-up’ quiz in
Tutorial 12 on presentation of a medical certificate of illness for the relevant period, or
upon evidence of a serious and utterly exceptional crisis. This make-up quiz will be
graded out of 6 marks.
Brief answers to the quizzes will be available in both the Resource Room of the Faculty of Commerce in the week immediately after the corresponding tutorial has taken place.

14. MID-SESSION TEST (27% of the Total Assessment)

Testing is a necessary teaching tool. Well-constructed tests reinforce what you have learnt and expose what you have failed to learn. The Mid-session Test will be a real waker-upper to somnolent students.

The Mid-session Test will be held on

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<tr>
<td>Saturday</td>
<td>5 May</td>
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What do I have to study for the Mid-session Test?

Inevitably the day will come when you need to study the material again for the Mid-session Test.

Please note that examinable material will include all of the following:

(a) all material presented in the lectures;

(b) all material discussed in the tutorials;

(c) those parts of the textbook which discuss the topics developed in the lectures;

(d) any other material designated as compulsory reading in course handouts or in lectures.

Structure

• The Mid-session Test will cover the work of the first 9 weeks of the Autumn Session and Tutorials 1 to 9 inclusive.

• The Mid-session Test will be 90 minutes long, including reading time.
• It will consist of 27 multiple choice questions.
• All questions will be of equal value, i.e. one mark each.
• Each multiple choice question will contain five options.
No Supplementary Examination

No supplementary examinations will be provided for the Mid-session Test.

If there are exceptional circumstances preventing you to sit for the Mid-session Test, you will have to apply for Special Consideration explaining the reasons for not attending the test.

If there are valid reasons, any student who fails to attend this test will have these marks accumulated onto their Final Examination which will represent 67% of the total assessment.

Students must provide at least one valid reason (for example, a convincing medical certificate) in order to be allowed to accumulate marks in this manner.

14. FINAL EXAMINATION (40% of the Total Assessment)

What do I have to study for the final examination?

Please note that examinable material will include all of the following:

(a) all material presented in the lectures;
(b) all material discussed in the tutorials;
(c) those parts of the textbook which discuss the topics developed in the lectures;
(d) any other material designated as compulsory reading in course handouts or in lectures.

Structure

• The Final Examination will cover the work of the last 5 weeks of the Autumn Session and Tutorials 8 to 12 inclusive.

• The Final Examination will be two hours long.
• It will consist of 40 multiple choice questions.
• All questions will be of equal value, i.e. one mark each.
• Each multiple choice question will contain five options.

15. SUPPLEMENTARY FINAL EXAMINATION

Entitlement to a Supplementary Examination is not guaranteed. A multiple choice-type examination will not be offered as a Supplementary Examination. Students entitled to a Supplementary Examination will be required to answer five questions (with no choice), namely: two essay-type questions, and three problem-type questions, in three hours.
It is responsibility of those students:

• to **ascertain** the date of the Supplementary Examination, and
• to **ensure** that both the University Administration and the Department of Economics Secretary has their correct address and contact telephone number.

Even though the questions for the Supplementary Examination will not be intrinsically more difficult than those in the Final Examination, tutorial questions will **not** be replicated in the Supplementary Examination. The Supplementary Examination will cover the work of the **whole** Autumn Session for students who did not sit for the Mid-session Test.

The marks will **not** be scaled up if the Supplementary Examination in aggregate is more difficult than intended.

**16. IMPORTANT NOTES**

**QM2 Workbook**

Attendance at lectures is important.

**Please, do not forget to bring your *QM2 Workbook* each class.**

**Missing a lecture?**

Should a student miss a lecture, **neither** the lecturer **nor** the tutors will provide teaching material covering the missing lecture. Consequently, it is strongly advisable for students to have a ‘**contact**’ fellow student to obtain the corresponding class notes, handout material, and announcements.

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**Do get to know other students in class!**

**Announcements about class matters**

It is the student’s responsibility to be informed about class matters. If you miss a lecture or tutorial (or if you are late for a lecture or a tutorial), it is your responsibility to obtain any announced information from **others** in the class.
**Missing a tutorial?**

Answers to the tutorial quizzes will **not** be distributed among the students. If you are missing a tutorial, you can **either resort** to a contact fellow student in order to collect the corresponding tutorial notes **or** go to the Resource Room (see Section 13).

**A few words of warning**

The development of suitable quantitative methods skills is a **cumulative process**: the skills developed in **early** topics will be assumed in **later** topics as we introduce more complex themes. It is important, therefore, to make sure that you **do** understand the material as it progresses.

**Feedback**

Constructive comments and feedback are always welcome by your tutors and lecturer. If something is bugging you, let us know.

**SECTION C: RULES, CODES OF PRACTICE & POLICIES**

**C1 University Policies**
Information on the following University Policies can be found at the websites below:

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* see brief explanation of policy below.

**C1.1 Non-discriminatory Language**

The Faculty of Commerce supports the University’s policy on the use of non-discriminatory language. It is the responsibility of students to ensure that they understand and abide by this policy. The policy is available at:


**C1.2 Special Consideration Policy**

The Faculty of Commerce recognises that it has a responsibility to ensure equity and consistency across its subjects for all students. Sometimes, in exceptional circumstances, students need to apply for special consideration in order to complete all assessable work. The University applies strict criteria to the granting of special consideration. Before applying for special consideration students should carefully read the University’s policy. The policy can be found at:


**C1.3 Student Academic Grievance Policy**

The Faculty of Commerce aims to provide a fair, equitable and productive learning environment for all its students. The Student Academic Grievance Policy seeks to support the achievement of this goal by providing a transparent and consistent process for resolving student academic grievances.

Any student who has a grievance over a result should obtain a Faculty of Commerce Appeal of Assessment Form from the Schools or the Sub-Dean’s Unit. The student should firstly
take the form to the marker/lecturer to discuss the matter and, if the student is still not satisfied, s/he should take the next step as outlined on the form.

Once the grievance has been considered by the Faculty, if the student still feels the situation has not been fully resolved s/he may consult the Dean of Students. However, the Dean of Students can have no input into the academic judgement of the lecturer and can only review the grievance to ensure proper procedure has been followed.

For more information, please consult the policy in full at


C2 Faculty and school policies

Referencing

WHY DO YOU NEED TO REFERENCE?

At University it is necessary to acknowledge the sources of information and ideas that you have incorporated in your assignments. Failure to do this thoroughly may result in accusations of plagiarism: this is the academic equivalent of stealing (because by not acknowledging someone else's work, you are presenting it as your own). Plagiarism is taken very seriously by the University and may result in expulsion from the University.

Referencing is not only about acknowledging other people's work: accurate referencing and lists of references are beneficial when researching a topic as they allow the reader to follow up information and read further into the area. In a sense, references provide readers with clues to help them explore different avenues of a topic. This aspect of referencing will become more valuable to you as you progress in your studies.

There is a correct procedure that must be followed when referencing and using footnotes. Not complying with these set techniques and format will most likely result in loss of marks.

When writing an essay it is easiest to reference as you go, making sure you are writing down all relevant information. This will save hours trying to find the source again in the library.

THE HARVARD SYSTEM OF REFERENCING

The Faculty of Commerce uses the Harvard system of referencing. This system makes use of short references within the body of the text. It is supplemented by a detailed list of references at the end of the text, which provides all the information necessary to find the source material. In-text references include the author and year of publication, and where necessary the page number(s).

*It is the responsibility of students to ensure that they are familiar with the Harvard system of referencing and that they use it accurately in all written work submitted.*

Students should consult the following University Library website for a detailed explanation and examples of the Harvard system of referencing.

Citation of Electronic Sources

It is necessary for students to reference all sources used in their written work, including file transfer protocol sites, worldwide web sites, telnet sites, synchronous communications (MOOs, MUDs, IRC, etc.) Gopher sites, and email, Listserv and Newsgroup citations.  

*It is the responsibility of students to ensure that they are familiar with the accepted Faculty of Commerce practice for referencing electronic material and that they use it accurately in all written work submitted.*

Students should consult the following University Library website for a detailed explanation and examples of how to reference electronic material.


C3 Support Services and Facilities

Learning Resource Centre

Learning Development offers a range of free services to all enrolled students who wish to improve their academic or English language skills. There are a range of workshops available including; essay writing and editing; reading for assignments; grammar; presentation skills; pronunciation and exam preparation.  

For information on language and academic skills workshops, or to make appointments for consultations, please visit the Learning Resource Centre (LRC), Building 19, Ground Floor, Room G102, or Phone 02 4221 3977. For further information visit the website:  


Faculty Librarians

Each faculty has a Faculty Librarian who is available to help with research related enquiries. Research Help Desk staff are also available in the Library to assist with research needs.

The Faculty Librarians for Commerce can be contacted as follows:  

email:  
lib_commerce@uow.edu.au

telephone:  
42 213078

Disability Liaison Officer

The **Disability Liaison Officer** (DLO) can provide advice on how particular disabilities affect university study and information on resources available at the University for assisting students with disabilities. Students commencing courses are advised to contact the Disability Liaison Officer prior to the beginning of their first session of study.

For further information on services offered, consult the Disability Services website or contact the office.
Faculty Disability Advisers

Faculty Disability Advisers are academic staff who provide assistance and support to students with disabilities within their Faculty and act as an intermediary between the student and the Faculty's academic and general staff. They provide support, educational advice and referral to appropriate staff on issues related to teaching and learning within the Faculty and the University. Students are advised to communicate specific information about the ways in which their disability affects learning to the Faculty Disability Adviser as soon as possible after enrolment.

The Faculty of Commerce Disability Adviser is Mr. Ron Perrin. Mr Perrin can be contacted as follows:

Office location: Building 40, room 224
email address: ron_perrin@uow.edu.au
telephone: 02 4221 4118

WOOLYUNGAH INDIGENOUS CENTRE

The Woolyungah Indigenous Centre provides academic and personal support for Aboriginal & Torres Strait Islander and other indigenous students. The Centre also runs an Indigenous Specific Orientation Program for students who gain entry to the University through the alternative admissions program.

For further information on services offered, consult the Woolyungah Indigenous Centre website or contact the office.

Centre location: Building 30
web address: http://www.uow.edu.au/aec/
telephone: 02 4221 3563
fax: 02 4221 4244