Year and Semester: Semester 2, 2010

Unit convenor: Dr. Stéphane Mahuteau

Prerequisites: no prerequisite is imposed; however, knowledge of intermediary level Microeconomics is advisable. Students should also be familiar with basic algebra and optimization.

Credit points: 4

Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit.

ABOUT THIS UNIT

• Unit description and rationale

With the recent development of Experimental economics as a refutation tool, Game theory has emerged as an important field providing Economists with tools to deal with strategic and social interactions. The aim of this course is to introduce students to the methodology of Game theory with an emphasis on applications to real economics issues. The first half of the course will be more lecture-based in order to give the students the necessary tools to comprehend the wide literature on the subject. The second half will involve readings on a variety of topics where Game theory and Experimental economics constitute a relevant tool of analysis. It is recommended that students attending this unit have a knowledge of Microeconomics at the intermediary level and be familiar with algebra and optimization.

TEACHING STAFF

• Convenor:  
  Stéphane Mahuteau  
  Phone:9850-8489  
  Room: E4A 432  
  Email: stephane.mahuteau@mq.edu.au

CONSULTATION TIMES

Tuesday 13h to 15h, E4A-432  
Wednesday 11h to 13h, E4A-432  
By appointment for other times
You are encouraged to seek help at a time that is convenient to you from a staff member teaching on this unit during their regular consultation hours. In special circumstances, an appointment may be made outside regular consultation hours. Staff will not conduct any consultations by email. You may, however, phone staff during their consultation hours.

Students experiencing significant difficulties with any topic in the unit must seek assistance immediately.

**CLASSES**

- There is one three-hour lecture per week.
- The timetable for classes can be found on the University web site at: [http://www.timetables.mq.edu.au/](http://www.timetables.mq.edu.au/)
- It is assumed that students will attend all lectures. Students who miss classes put themselves at a significant disadvantage for several reasons, including:
  
  (i) Not all the material in the text is covered in the unit, and not all the material in the unit is covered in the text. In some places the text deals with issues in greater depth than is necessary for the unit, and in other places it doesn’t go far enough. The lectures contain all the unit material taught at the level required for the assessment tasks, and are your guide to the unit content.
  
  (ii) The text is only a support for the students, lectures are not a repeat of the text, they extend beyond the scope of the text for some topics.
  
  (iii) The approaches to some problems that are recommended by the lecturer are different to those in the text.
  
  (iv) The lectures will include significant guidance about the style and content of the final exam and recommendations about study technique.
  
  (v) It is difficult (and often impossible) for staff to provide meaningful assistance to students outside class times on topics for which they did not attend the relevant lectures and tutorials.

**REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS**

- Gary Koop, Analysis of Economic Data, Third Edition, John Wiley 7 Sons Ltd., 2009

The Co-op bookstore has this book and it is recommended that students purchase a copy.

- A complete set of Lecture notes will be available on Blackboard
• ADDITIONAL TEXTS (all available at the library):

Kreps D., (1990), Game Theory and Economic Modelling (Clarendon Lectures in Economics), Oxford University Press, USA.

UNIT WEB PAGE

• The web page for this unit can be accessed via learn.mq.edu.au. You should check this web page regularly. The lecture slides for each week's lecture will be posted on the web page. In order to maintain enough flexibility to the content of the lectures, some lecture notes may appear on the web page after the lecture.
• We also use the web page to post important notices from time to time. Course material is available on the learning management system (BlackBoard)

LEARNING OUTCOMES

After successfully completing this unit, you will:
• be familiar with the key concepts of Game Theory
• be able to use game theoretic tools to explain a wide range of economic situations
• be able to use game theory in a business environment
• be able to critically evaluate academic research and studies using Game Theory as an analytical tool, including having an understanding of the technical aspects of such studies.
• be able to continue any future studies in economics with increased confidence

All academic programs at Macquarie seek to develop students’ generic skills in a range of areas. One aim of this unit is that you will develop your skills in literacy and numeracy; group-work and communication; problem solving and critical thinking; and creativity.

GRADUATE CAPABILITIES

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world.
This unit contributes to this by developing the following graduate capabilities:

1. Discipline Specific Knowledge and Skills*
2. Critical, Analytical and Integrative Thinking
3. Problem Solving and Research Capability
4. Creative and Innovative
5. Effective Communication
6. Capable of Professional and Personal Judgement and Initiative
7. Commitment to Continuous Learning

Discipline Specific Knowledge and Skills: Ability to
   a. Understand existing economic theories
   b. Apply economic theories to practical situations or problems
   c. Critically evaluate and test competing economic theories, comparing predictions to actual outcomes
   d. Develop new theories based on the learning from critical evaluations of existing economic theories
   e. Build and estimate mathematical models
   f. Use estimated models for prediction and evaluation
   g. Examine real world issues from an economic perspective

**TEACHING AND LEARNING STRATEGY**

- In the 3-hour “lecture” class, we will present new material in the form of lectures. No tutorial is formally scheduled but practice exercises will be an integral part of each. We will answer your questions during and after lectures. We will also answer questions during our consultation times and by e-mail.

- Your role: We expect that you will attend all lectures and tutorials. We expect you to read all the material prescribed on the reading list. We expect you to be prepared to participate actively in the lectures. We also expect that you will make a good attempt at the assignment and final exam.

- Following is an indicative list of topics covered during the semester. These topics may be updated in order to cover some topics more in depth upon students’ demand or in order to adapt the course content to the level of technical knowledge of the majority of students joining the unit.

**Lecture 1: Introduction and reminder on decision under risk**

In this lecture we introduce the unit and discuss the modes of assessment that will be used in this unit. Moreover, we introduce the topic and define what is a game, how one classifies games and we'll discuss the topics that will be covered throughout the semester. We'll start the course with a first topic, namely: Decision under risk. Even though decision under risk involves a single decision maker (that has little to do with game theory per se), this lecture is important. It provides a reminder of expected utility formulations used in Economic Theory and in Game Theory as the commonly used tool to express individuals’ utility when the outcome of their decision involves risky outcomes.
Lecture 2: Static games of complete information (normal form games and Nash Equilibrium)

In this lecture we define static games of complete information, introduce the concepts of dominance, iterated dominance, mixed strategies and Nash Equilibrium. We investigate the conditions of existence of a Nash equilibrium in such games and look at the issue of multiplicity of equilibria. We illustrate the concepts and their use through examples such as Cournot static competition, Hotelling model of differentiation, voting, etc…

Lecture 3: Static games of complete information 2 plus exercises session.

This lecture continues the previous lecture on static games of complete information and moves to a more advanced topic: namely Quantal Response equilibrium whose aim is to model noise in individuals’ responses to their beliefs when playing mixed strategies.

The second part of the lecture will be dedicated to an exercise session where students will have the opportunity to apply the concepts discussed during the past lecture.

Lecture 4 and 5: Extensive Form Games and Subgame perfection

In this lecture we'll first finish the exercise session of the previous week if need be. The lecture will move on to the introduction of extensive form games (or dynamic games of complete information). We'll define what is a game in extensive form, look at the Nash equilibria arising from such games. We'll show that the concept of Nash equilibrium is not satisfactory to come up with accurate predictions of the outcomes of such games. We introduce a first refinement of the Nash equilibrium, namely Subgame Perfect Nash Equilibria.

Lecture 6: Extensive form games: applications and introduction to bargaining

This lecture continues the previous lecture and provides applications of dynamic games of complete information. In a second part of the lecture we introduce a particular type of multistage game of complete information: Bargaining. A significant part of the lecture will be dedicated to the alternating offers bargaining model of Rubinstein.

Lecture 7: Experimental results on the alternating offers bargaining game and improvements to the theory to account for extra material considerations

In this lecture, we use experimental economics results to illustrate the predictive power, or lack thereof of the subgame perfect Nash equilibrium in alternating offer bargaining games. We discuss the recent literature that investigates the role of others regarding preferences in bargaining outcomes and propose a number of alternatives aimed at improving the predictive power of game theory in such games. A part of this lecture will be dedicated to the methodology of experimental
economics in order to give students the necessary tools for them to conduct their own experiments (this last part may take up a bit of next week’s lecture).

**Lecture 8: Repeated games**

In this lecture, we introduce repeated games, namely situations where players have the opportunity to play several times. We introduce another refinement of the Nash equilibrium in these games and investigate the conditions of existence and stability of cooperation between two players. We discuss the Folk Theorem, renegotiation proofness and extend the Folk Theorem to situations where imperfect public information prevails.

**Lecture 9: Static games of incomplete information**

In this lecture we look at games in which players have private information about something relevant to their decisions. We’ll introduce yet another refinement of the Nash equilibrium, namely Bayesian Nash Equilibrium. The second part of the lecture will be dedicated to illustrative exercises.

**Lecture 10: Dynamic games of incomplete information (Perfect Bayesian Equilibrium, Sequential equilibrium, trembling hand perfection)**

In this lecture we expand the previous concepts to situations where individuals have to take sequential decisions. We introduce the concept of perfect Bayesian equilibrium as a refinement of the SPNE used in dynamic games of complete information.

**Lecture 11: Dynamic Games of incomplete information 2, plus exercises**

This week’s lecture we look at the shortcomings of the concept of perfect Bayesian equilibrium in dynamic games of incomplete information and introduce alternative concepts such as Sequential equilibrium and Trembling Hand Perfection.

**Lecture 12: Topic to be announced**

**Lecture 13: Students presentations and revision session**

### Research and Practice

- This unit uses research by Macquarie University researchers (see website of the unit)
- This unit uses research from external sources (see website of the unit)
- This unit gives you practice in applying research findings in your assignments
- This unit gives you opportunities to conduct your own research

### Relationship Between Assessment and Learning Outcomes

Assessment will be based on the following THREE activities. Students must satisfactorily complete ALL THREE activities to be eligible to pass this unit.
ACTIVITY 1: MULTIPLE CHOICE EXAM (10%)

A Multiple Choice Exam will be held during week 6’s lecture time. It is a one hour exam. The exam will include questions on all material covered in the lectures and teaching material (either posted on the unit website or relevant book chapters) up to week 5.

ACTIVITY 2: PROJECT and PRESENTATION (30 %)

This activity comprises two stages:

STAGE 1:
One project of about 3000 words should be submitted no later than 6.00pm on week 12. It is a team work, students have the opportunity to form a team of two or more students to complete both stages of the project.
Projects are to be placed in the Econ884 box in BESS. A photocopy of your essay should be retained. Further, an electronic copy should be sent to the lecturer in charge at the address: stephane.mahuteau@mq.edu.au by the due date.
A list of student identification numbers for all students from whom a project has been received will be posted on the Econ884 web page within 48 hours of the submission date. You must check this list immediately. If your number is not on the list, but you have submitted a project, contact Stéphane Mahuteau immediately. If you do not follow this procedure then you cannot claim at the end of the year that your project was submitted but not returned to you.

STAGE 2:
On the last week of lecture, each student team will present his (her) project in front of the class for 10 to 15 minutes, using powerpoint presentations.

The total mark awarded for this activity will take into account both the originality and quality of the written part of the project and the quality of the class presentation.

The students will be free to choose their own topic or pick a suggested topic from the unit homepage.

Assignments submitted late will NOT BE ACCEPTED. If any assignment cannot be delivered by the due date because of illness or unavoidable disruption, as described in the rules for obtaining Special considerations for the final examination, an extension may be granted by the lecturer in charge.

ACTIVITY 3: Final examination (60%)

A final examination is included as an assessment task for this unit to provide assurance that:

i) the product belongs to the student and

ii) the student has attained the knowledge and skills tested in the exam.
End of unit **three hour written examination**, to be taken during the end of year examination period. The examination will cover material drawn from all parts of the unit’s subject matter.

The University Examination period in Second Half Year 2010 is from Wednesday 17 November to Friday 3 December.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations. [http://www.timetables.mq.edu.au/exam](http://www.timetables.mq.edu.au/exam)

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. The University’s policy on special consideration process is available at [http://www.mq.edu.au/policy/docs/special_consideration/policy.html](http://www.mq.edu.au/policy/docs/special_consideration/policy.html)

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period. (Individual Faculties may wish to signal when the Faculties’ Supplementary Exams are normally scheduled.)

The Macquarie university examination policy details the principles and conduct of examinations at the University. The policy is available at: [http://www.mq.edu.au/policy/docs/examination/policy.htm](http://www.mq.edu.au/policy/docs/examination/policy.htm)

**Requirements to Pass This Unit**

To pass ECON884, students must satisfy each of the following requirements:

1. An overall satisfactory performance in all assessment components;
2. Submission of the econometric projects

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### Academic Honesty

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately.
Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

**GRADING APPEALS AND FINAL EXAMINATION SCRIPT VIEWING**

If, at the conclusion of the unit, you have performed below expectations, and are considering lodging an appeal of grade and/or viewing your final exam script please refer to the following website which provides information about these processes and the cut off dates in the first instance. Please read the instructions provided concerning what constitutes a valid grounds for appeal before appealing your grade.

http://www.businessandeconomics.mq.edu.au/for/new_and_current_students/undergraduate/admin_central/grade_appeals

**SPECIAL CONSIDERATION**

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. A special consideration policy exists to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. The policy is available at: http://www.mq.edu.au/policy/docs/special_consideration/procedure.html

**STUDENT SUPPORT SERVICES**

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at http://www.student.mq.edu.au.

[Individual Unit Convenors may wish to add Unit/ Faculty specific support eg BESS, Room, PAL, E4B Consultation Room.]

**IT CONDITIONS OF USE**

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorised coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilising University IT facilities. The following regulations apply to the use of computing facilities and online services:
- Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.
• Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action without further notice.

Students must use their Macquarie University email addresses to communicate with staff as it is University policy that the University issued email account is used for official University communication.