ECON2141

Strategic Thinking: An introduction to Game Theory

In many - perhaps most - economic, political, legal and social interactions, there is potential for strategic behaviour, a term, “intended to focus on the interdependence of the adversaries' decisions and on their expectations about each other's behaviour.” (Schelling, 1960, The Strategy of Conflict). Recognising and understanding such behaviour is an essential part of any analyst's toolkit and this course is designed to enable just such recognition and understanding. Game theory has successfully been applied in a diverse range of fields, such as economics, political science, military analysis, law, biology and computer science.

The aim of this course is to provide an introduction to strategic thinking and analysis through the basic techniques of game theory and to illustrate the range of its applications in a number of fields of social interaction. While the level of the course will be introductory, and mathematical prerequisites are minimal, the presentation of the material will rely on precise logical arguments. This course should be of interest to students from any part of the University.

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>On campus</th>
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<tbody>
<tr>
<td>Prerequisites</td>
<td>To enrol in this course you must have successfully completed 24 units of any courses.</td>
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<tr>
<td>Incompatible Courses</td>
<td>Not applicable</td>
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<tr>
<td>Co-taught Courses</td>
<td>Not applicable</td>
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<tr>
<td>Course Convener:</td>
<td>Simon Grant</td>
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Phone: 5 8688
Email: simon.grant@anu.edu
Office hours for student consultation: Thursday 2:00-3:30pm or by appointment
Relevant administrator: Nicole Millar
Phone: 5 0384
Email: enquiries.rse@anu.edu
Tutor(s): TBD

SEMESTER 2
2017
COURSE OVERVIEW

Course Description
Game theory is a way of thinking about strategic situations. One aim of the course is to teach you some strategic considerations to take into account when making your own choices. A second aim is to predict how other people or organizations behave when they are in strategic settings. We will see that these aims are closely related. We will learn new concepts, methods and terminology. A third aim is to apply these tools to settings from economics and other disciplines. The course will emphasize examples. We will also play several games in class.

Learning Outcomes
On satisfying the requirements for this course, students should have the knowledge and skills to:
1. Understand how game theorists think and approach a strategic problem.
2. Understand the tools taught in class and be able to recognise their application to the analysis of real world fact situations.
3. Recognise the strategic issues in a problem and understand how a game theorist might decide on the appropriate tools to analyse it.

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Date for Return of Assessment</th>
<th>Linked Learning Outcomes (optional)</th>
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<tbody>
<tr>
<td>1. Problem sets</td>
<td>25%</td>
<td>See course schedule below</td>
<td>1, 2 &amp; 3</td>
</tr>
<tr>
<td>2. Midsemester exam</td>
<td>25%</td>
<td>Wk 7 or Wk 8</td>
<td>1, 2 &amp; 3</td>
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<tr>
<td>3. Final exam</td>
<td>50% or 75%*</td>
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<td>1, 2 &amp; 3.</td>
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* If the minimum percentage score earned on the mid-term exam or on the problem sets is lower than the percentage score earned on the final, then the score for the mid-term exam or for the problem sets will not be used in calculating the final grade. Instead, the weight of the final exam will be increased to 75%. That is, the final exam's weight will be increased from 50% to 75% only if that improves a student's overall percentage score.

There will be fortnightly problem sets. I will endeavour to have them graded and returned, one week after the due date.

Doing the assignments is important for your understanding, and therefore shortcuts are not recommended. Sometimes, problems will be assigned on material not yet covered in class or that extends the lecture material; it's all right if you make mistakes, you will learn a lot from them. Each student must hand in an individually written answer to each assignment, but group discussion is encouraged.
The mid-semester exam is both **redeemable** and **optional**. If a student chooses not to sit the mid-semester exam then the weight of the final exam automatically will be increased from 50 to 75 per cent.

**Research-Led Teaching**

The lecturer is a user and developer of game theoretic models and applications in his own research. As a consequence, students will be exposed to the use of game theory and strategic thinking in current economic research.

**Feedback**

**Staff Feedback**

It is hoped that the lectures will involve a lot of discussion, questions and answers. We will provide timely grading and return of the fortnightly problems sets so that the students know how they have done on one piece of assessment before the next piece of assessment is due. There will be a review of the mid-semester exam (in tutorial time) and thus feedback to the class as whole.

**Student Feedback**

ANU is committed to the demonstration of educational excellence and regularly seeks feedback from students. One of the key formal ways students have to provide feedback is through Student Experience of Learning Support (SELS) surveys. The feedback given in these surveys is anonymous and provides the Colleges, University Education Committee and Academic Board with opportunities to recognise excellent teaching, and opportunities for improvement.

For more information on student surveys at ANU and reports on the feedback provided on ANU courses, go to

http://unistats.anu.edu.au/surveys/selt/students/ and
http://unistats.anu.edu.au/surveys/selt/results/learning/

**Policies**

ANU has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and implement them. You can find the University’s education policies and an explanatory glossary at:

http://policies.anu.edu.au/

Students are expected to have read the **Academic Misconduct Rule** before the commencement of their course.

Other key policies include:

- Student Assessment (Coursework)
- Student Surveys and Evaluations

**Recommended Resources**

No textbook is formally required but students should find the following useful (in this order).


[This is the text that is most closely related to the material presented in the lectures.]
Dixit, A., S. Skeath and D.H. Reiley, Jr (2009) *Games of Strategy* 3e. Norton. [This is pitched at a slightly less technically sophisticated level than Watson. Those students not familiar with differentiation of functions and maximization methods, may find it more accessible.]

Osborne, M. (2009), *An introduction to game theory*. International edition, OUP [This is a bit more advanced, but provides an excellent treatment of the material covered in the course, particularly suited for the mathematically sophisticated student.]

Students will be supplied with a list of selected readings and references to the Watson book as we proceed. Please note, that attendance at lectures is strongly recommended. Notes made by me during the lectures will be captured by the Echo360 recording, but I will not in general be preparing or posting lecture slides.

**COURSE SCHEDULE**

<table>
<thead>
<tr>
<th>Week</th>
<th>Summary of Activities</th>
<th>Assessment</th>
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<tr>
<td>0</td>
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<tr>
<td>2</td>
<td>Domination &amp; iterative deletion: applications. Best response and rationalizability: Applications Reading W: 7, 8</td>
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<td>4</td>
<td>Nash equilibrium applications continued. Linear-city model, voter-candidate model, Schelling location game. Reading W:10</td>
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<td>6</td>
<td>Evolution and Game theory. Osborne Chapter 13 (especially 13.1 &amp; 13.2)</td>
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<td>8</td>
<td>Games of perfect information: credibility, reputation, the game of duel. Reading W:21.</td>
<td>Mid-semester exam</td>
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<tr>
<td>9</td>
<td>Bargaining, introduction to imperfect information, information sets, subgame perfection. W:19, 14, 15</td>
<td>Problem Set 4 due</td>
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<td>10</td>
<td>Applications of SPE: strategic investment game, wars of attrition. Reading W:16 and Ghemawat</td>
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(1997) Games businesses play (ch 7).

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<tr>
<td>11</td>
<td>Repeated games: cooperation in prisoner’s dilemma, infinitely repeated games. Reading W:22, 23</td>
<td>Problem Set 5 due.</td>
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Examination period

**ASSESSMENT REQUIREMENTS**

The ANU is using Turnitin to enhance student citation and referencing techniques, and to assess assignment submissions as a component of the University's approach to managing Academic Integrity. For additional information regarding Turnitin please visit the ANU Online website.

Students may choose not to submit assessment items through Turnitin. In this instance you will be required to submit, alongside the assessment item itself, copies of all references included in the assessment item.

As a further academic integrity control, students may be selected for a 15 minute individual oral examination of their written assessment submissions.

Any student identified, either during the current semester or in retrospect, as having used ghost writing services will be investigated under the University's Academic Misconduct Rule.

**Assessment Tasks**

**Assignment submission**

**Offline Submission:** Students should deposit their answers in the appropriately labelled submission box which is located to the left on the inquiries desk on Level 1 of the HW Arndt Building (No. 25A). Assignments must include the cover sheet that can be downloaded from https://www.rse.anu.edu.au/media/720171/Assignment-Cover-Sheet.pdf. Please keep a copy of your answers to the assignment for your records.

**Extensions and penalties**

Extensions and late submission of assessment pieces are covered by the Student Assessment (Coursework) Policy and Procedure.

If you need an extension, you must request it in writing on or before the due date. If you have documented and appropriate medical evidence that demonstrates you were not able to request an extension on or before the due date, you may be able to request it after the due date.

*Please note that, in general, late problem sets will not be accepted.* Your mark for this component will exclude the problem set that you were awarded the lowest score. This allows for an unanticipated contingency that may arise during the semester. It is strongly recommended, however, that you endeavour to submit answers to all the problem sets.

**Returning assignments**

The graders will endeavour to return your assignments one week after the submission date and before the submission deadline for the following assignment.
**Scaling**

Your final mark for the course will be based on the raw marks allocated for each of your assessment items. However, your final mark may not be the same number as produced by that formula, as marks may be scaled. Any scaling applied will preserve the rank order of raw marks (i.e. if your raw mark exceeds that of another student, then your scaled mark will exceed the scaled mark of that student), and may be either up or down.

**Privacy Notice**

The ANU has made a number of third party, online, databases available for students to use. Use of each online database is conditional on student end users first agreeing to the database licensor’s terms of service and/or privacy policy. Students should read these carefully.

In some cases student end users will be required to register an account with the database licensor and submit personal information, including their: first name; last name; ANU email address; and other information.

In cases where student end users are asked to submit ‘content’ to a database, such as an assignment or short answers, the database licensor may only use the student’s ‘content’ in accordance with the terms of service – including any (copyright) licence the student grants to the database licensor.

Any personal information or content a student submits may be stored by the licensor, potentially offshore, and will be used to process the database service in accordance with the licensors terms of service and/or privacy policy.

If any student chooses not to agree to the database licensor’s terms of service or privacy policy, the student will not be able to access and use the database. In these circumstances students should contact their lecturer to enquire about alternative arrangements that are available.

**Tutorial Seminar Registration**

Tutorial signup for this course will be done via the Wattle website. Detailed information about signup times will be provided on Wattle or during your first lecture. When tutorials are available for enrolment, follow these steps:

1. Log on to Wattle, and go to the course site
2. Click on the link “Tutorial enrolment”
3. On the right of the screen, click on the tab "Become Member of….." for the tutorial class you wish to enter
4. Confirm your choice

If you need to change your enrolment, you will be able to do so by clicking on the tab “Leave group…..” and then re-enrol in another group. You will not be able to enrol in groups that have reached their maximum number. Please note that enrolment in ISIS must be finalised for you to have access to Wattle.

**SUPPORT FOR STUDENTS**
The University offers a number of support services for students. Information on these is available online from http://students.anu.edu.au/studentlife/