Course Description

The theory of games helps us understand situations where many agents interact in a strategic setting, where each agent’s wellbeing depends on the behaviour of all agents. Game theory is a collection of analytic techniques widely used in many sciences and business disciplines. It has provided powerful tools that have successfully been applied in almost every sub-field of Economics and in many other disciplines. A string of recent Nobel Prize winners who made significant contributions to pure and applied game theory highlights the increased recognition of this field. Within its framework, game theory allows for much creativity and imagination in developing new ideas and applications in a rigorous form.

The course covers a range of topics in basic, intermediate and advanced game theory, including cutting edge research topics (in the second part). This course is research intensive and highly recommended to all serious research students that have the necessary background and are able to keep with it. Some mathematical maturity is expected from students, but no
formal prerequisite is necessary other than calculus, basic linear algebra, and basic probability theory. During the course, all students are expected to have the ability to follow rigorous abstract arguments (math proofs), as used in the construction and analysis of mathematical models. Some prior knowledge of game theory (such as Nash equilibrium in normal form games) is an advantage, but not required. Students who are interested in learning game theory, but who are not mathematically mature should instead take **ECON2141/2142/8053 Strategic Thinking: An Introduction to Game Theory**.

The honours and postgraduate versions of this course (ECON3153, ECON4453 and ECON8053) are intended for students who would like to challenge themselves by learning additional advanced topics. Students will acquire a deeper understanding of game theory, which will provide a foundation for further study at postgraduate level.

The course has a core part of nine to ten weeks. Students are expected to study between classes, so they do not “get lost”. After the core part, the final weeks will be devoted to advanced research topics.

<table>
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<tr>
<th>Mode of Delivery</th>
<th>On campus</th>
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<tbody>
<tr>
<td>Formal Prerequisites</td>
<td>ECON2101 or ECON2111, and EMET1001/7001, or with the permission of the course convener.</td>
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<tr>
<td>Incompatible Courses</td>
<td>Only one of ECON3152/3153/4453/8053 can be taken.</td>
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<tr>
<td>Course Convener &amp; Lecturer:</td>
<td>Dr. José A. Rodrigues-Neto</td>
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<tr>
<td>Phone(s):</td>
<td>612 50384</td>
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<td>Email:</td>
<td><a href="mailto:jose.neto@anu.edu.au">jose.neto@anu.edu.au</a></td>
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<tr>
<td>Office hours:</td>
<td>By appointment</td>
</tr>
<tr>
<td>Student Administrator</td>
<td>Ms Nicole Millar (<a href="mailto:nicole.millar@anu.edu.au">nicole.millar@anu.edu.au</a>)</td>
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SEMMESTER 2 - July to November 2017

http://programsandcourses.anu.edu.au/course/ECON3152
http://programsandcourses.anu.edu.au/course/ECON3153
http://programsandcourses.anu.edu.au/course/ECON4453
http://programsandcourses.anu.edu.au/course/ECON8053

Days and Times

Lectures/Tutorial on Wednesday and Friday, from 5:00 pm to 6:55 pm.
The course starts on Wednesday 26/July/2017.

Location

Wednesday = Arndt LT-1 (building code 25A on ANU campus map)

Friday = RN Robertson T (building 46 on ANU campus map. Address: 46 Sullivans Creek Road, Acton ACT 2601).

Learning Outcomes

By the end of the course students will:

- have a sound command of game-theoretic techniques
- formulate economic problems in terms of game-theoretic models and apply the tools provided in the course for analysing them
- be able to read and answer questions about selected applied models of game theory in economics
- apply the basic principles of maximisation and minimisation to game theory problems and models
Assessment Summary

<table>
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<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
<th>Date for Return of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. oral exam</td>
<td>Up to 05 points</td>
<td>16/Aug/2017</td>
<td>Same day</td>
</tr>
<tr>
<td>2. final (written) exam</td>
<td>Up to 95 points</td>
<td>TBA by Timetable Office (they control this and I have no clue about when they will announce the day of the final exam or when the final exam will be)</td>
<td>RSE has a scheduled date for announcing final results (see RSE web site)</td>
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Final Grade

Raw final grades can be curved up or down, but the final grades (after curving) will preserve the ordinal ranking that students had in their raw final grades.

The raw final grade of each student is given by: 95% final exam + 05% oral exam.

Students in their (expected) final semester are strongly advised to be especially cautious and do not make unchangeable plans before learning their academic results officially.

Research-Led Teaching

Problems and examples are based on cutting edge formal scientific models. These models are drawn from the highest level academic research in the relevant fields/disciplines.

Feedback – Staff Feedback

Students will be given feedback in the following forms in this course:
Verbal feedback (upon request) during or after lectures
Verbal feedback (upon request) during and after tutorials
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 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/

We kindly ask all students to complete the teaching evaluations in the end of the semester.

(Tentative) Topics for the course

1- Core Topics:

Deterministic Individual Choice (formalizing every bit of it): Preference Relations, Choice Functions, Revealed Preferences

Brief review of Probability Theory

A bit of Choice under Uncertainty (Expected Utility Theory, Rank-Dependent Utility Theory)

The Scope of Game Theory, Examples

Pure and Mixed Strategies in Normal Form Games

Nash Equilibrium, Domination, Classic Applications/Examples
Extensive Form Games (with complete information): Sub-Game Perfection, Examples

Aggregative Games

Correlated Equilibrium (with Complete Information)

Static Games of Incomplete Information

Information Structures: Partitions, Correspondences, Knowledge Operators, Bounded Rationality

Common Knowledge, The Join and the Meet of Partitions

Aumann’s Agreement Theorem

2- Additional (non-core) Topics

Harsanyi Consistency (of Beliefs) and the Role of the Common Prior Assumption, No Trade Theorem (if time permits)

Matching Theory (Gale & Shapley), the Stable Marriage and the Stable Roommates Problems (if time permits)

Models that include Social Status Concerns (if time permits)

Information Structures (if time permits)

Other Advanced/Research Topics, depending on students’ interest (if time permits)
The plan is to have the core topics covered first, and then, depending on the students’ interests, we can cover specific advanced topics and have a few research seminars.

**Attendance**

It is strongly, very strongly recommended that students attend all classes, including all lectures and tutorials. This is really important in this course. Failure to attend all classes in this course will decrease significantly your learning, and cannot be fully compensated with self-study due to the special interactive nature of this course. Students with frequent time conflict are advised not to enrol in this course this semester. Attendance to all lectures and tutorials is really extremely important. The course is challenging, fast passed and the contents are cumulative.

**Texts and Other Reading**

Students may want to purchase the Martin Osborne textbook or additional books on game theory. They may also wish to download the course notes and teaching materials available online in Wattle, and print them. These activities are strongly recommended, but not mandatory.

**Prescribed Texts:**


Please, at least photocopy chapters 1, 6, 7 and 8 of Mas-Colell et al.

I would strongly recommend all economists to buy this very important, excellent textbook, very likely the best, most important textbook in Economics.
Recommended Reading:

Probability Theory Textbook:


Game Theory Textbooks:


Decision Theory Textbook:

Articles & Research Papers or Monographs:

Information and Knowledge:


Taylor, James and Rodrigues-Neto José A., Cycles and Common Priors without Full Support, unpublished manuscript.

**Aggregative Games, Public Economics or Industrial Organization:**


**Matching Theory:**


**Game Theory on:**


Audiopedia: [www.youtube.com/watch?v=mtqn1YbSqTA](www.youtube.com/watch?v=mtqn1YbSqTA)

**Nobel Prizes:**


Required Resources
Commonwealth supported students and domestic full-fee paying students generally must be able to complete the requirements of their program of study without the imposition of fees that are additional to the student contribution amount or tuition fees. Provided that its payment is in accordance with the Act, a fee is of a kind that is into any one or more of the following categories:

(a) It is a charge for a good or service that is not essential to the course of study.

(b) It is a charge for an alternative form, or alternative forms, of access to a good or service that is an essential component of the course of study but is otherwise made readily available at no additional fee by the higher education provider.

(c) It is a charge for an essential good or service that the student has the choice of acquiring from a supplier other than the higher education provider and is for:
   (i) equipment or items which become the physical property of the student and are not consumed during the course of study; or
   (ii) food, transport and accommodation costs associated with the provision of field trips that form part of the course of study.

(d) It is a fine or a penalty provided it is imposed principally as a disincentive and not in order to raise revenue or cover administrative costs.

Additional course costs
Students may want to purchase the textbook or additional books on mathematical economics. They may also wish to download the course notes and teaching materials available online in Wattle, and print them. These activities are recommended, but not mandatory.

Examination material or equipment
Students should bring pen and pencil to the final exam.
No other materials allowed not even dictionaries, notes or calculators.
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

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.

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/