BDP 509: Applied Game Theory*

Syllabus

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Summer Session II, 2022

Abstract

This course introduces the basic concepts of game theory and demonstrates how these concepts are used in the social sciences. We will do this by outlining the core definitions used in the subject, applying them to strategic scenarios and discussing the philosophy behind the concepts and their broader applications. By the end of the course students will be able to:

1. identify and derive different types of equilibria and compare these to social and efficient benchmarks,
2. translate strategic scenarios into well defined games including simultaneous, sequential, repeated and co-operative games, and
3. be able to explain the philosophical differences in the approach to studying a game and how this is determined by the analysts objectives.

This course is designed for those who have a strong interest in the behavioural and decision sciences but who do not necessarily have prior (formal) education in Economics or mathematical analysis. Student assessment is designed with this and the course objectives in mind.

1 Course Details

Lectures: Mondays and Wednesdays, 12:00-1:45, June 30th till August 5th, 2022.

- 12:00-1:00, core topic lecture
- 1:00-1:30, group problem solving

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- 1:30-1:45, broader discussion

All recorded, attendance encouraged but not compulsory.

Office Hours: after class or by appointment.

2 Learning Materials

There will be no *required* textbook for the course, however I recommend the following two resources:

1. For an overview of a particular topic, for more questions and depth, or to find a precise definition or result: Dixit, A., Skeath, S., and Reiley, D. (2014). Games of Strategy, fourth edition. New York: W. W. Norton and Company
2. For revisiting a topic with a different voice and testing your knowlege: Matthew Jackson's online Game Theory course through Coursera, https://www.coursera.org/learn/game-theory-1syllabus

Further, if you wish to visit the source material, I will be using the following guides to build my lectures:

- Don Ross's entry on Game Theory in The Stanford Encyclopedia of Philosophy: Ross, Don, "Game Theory", The Stanford Encyclopedia of Philosophy (Fall 2021 Edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/fall2021/entries/game-theory/.
- Osborne and Rubinstein's concise, though more technical, treatment of the subject: A course in game theory by Martin J. Osborne and Ariel Rubinstein (MIT Press, 1994)
- Lecture notes from Professor David Dillenberger, University of Pennsylvania, and Professor Martin Richardson, the Australian National University

We will quickly see how integrated game theory and microeconomics are. To this end, here are three recommendations for approaching microeconomics from a non technical perspective that would also make for enjoyable Summer reading:

- Who gets what and why, Al Roth (2015)
- Freakonomics Podcast, Stephen Dubner (on going)
- Thinking fast and slow, Daniel Kahneman (2011)

3 Tentative timeline

Week 1: History and motivation, utility representation, normal form games, canonical games: prisoners dilema, stag hunt, matching pennies

Week 2: Equilibria and benchmarks, lottery payoffs and the expected utility hypothesis, mixed strategies aand equilibria

Week 3: Extensive form games, equilibria refinements, co-operative games

Week 4: Incomplete information and Bayes rule, repeated games, application to public goods

Week 5: Behavioural games and experimental game theory (Kaynesian beauty game, Rubinstein materials), fun extensions (private search, Suckerpinch chess algorithms)

4 Assessment

Engagement: attending lectures on zoom or catching up asynchronously, responding to discussion prompts throughout the Summer, attending office hours (20%)

5 quizzes: available on canvas (online quiz) after select lectures, due by Sunday night of their respective week, best 8 of 10 (8% each = 40%)

1 assignment/take home exam: available on canvas (PDF) at the beginning of week 3, due by Sunday night of their respective week (15%)

1 final take home exam: available on canvas (tbd) after our final lecture in week 5, due by Friday night of week 5 (25%)

Optional short project: to be discussed in class and in office hours (flexible topics and types of submission), due by Sunday night of week 5, must be discussed with the lecturer beforehand (bonus of up to 20%)

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