

HUL311: Applied Game Theory

Course Instructor: Debasis Mondal (Office MS606)

Course Outline:

This is an introductory course in game theory. The course aims to provide you with some mathematical tools for analyzing strategic situations - your optimal decision depends on what other people will do. We will study central solution concepts in game theory such as Nash equilibrium, subgame perfect equilibrium, and Bayesian equilibrium. Game theory has been widely recognized as an important analytical tool in such fields as economics, management, political science, psychology and biology. To illustrate its analytical value, we will cover a variety of applications (mostly within economics discipline) that include international relations, development economics, business competition, auctions, etc. etc. There is prerequisite for this course – any two HUL2** level courses. Some background on microeconomics and familiarity of probabilistic thinking would be helpful in this course.

Text/reference books:

For the understanding of game theory at the undergraduate level, these two books are recommended. The first one is concise and quite popular, while the second came out recently and regarded as more comprehensive book in theory. Our lectures will mostly be based on these two books.

1. [Steven Tadelis](#), Game Theory: An Introduction, 2012
2. [Robert Gibbons](#), Game Theory for Applied Economists, 1992

Those of you interested in pursuing the subject further may consult the following advanced and authoritative sources (all of them are recommended at the Ph.D. level).

3. [Drew Fudenberg and Jean Tirole](#), Game Theory, 1991
4. [Martin Osborne and Ariel Rubinstein](#), A Course in Game Theory, 1994
(You can download it **for free** from [here](#))

Course plan:

Lectures: About 22 lectures (out of a total of 28 lectures, each lecture being 80 minutes duration) of this course will be devoted in understanding the basic solution concepts – with examples taken from various sources. Rest 6 lectures will be devoted in reading and presentation of papers with application of game theory.

In lecture part, we'll cover each chapter of the book by Steven Tadelis with examples from other books, especially from the book by Robert Gibbons. Our plan is to do as much as we can during the 22 lectures time period. A tentative guide is as follows (where chapters are following from Tadelis's book):

Topic 1 – Uncertainty and time (Ch-2)

Topic 2 – Static games of complete information (Ch-3)

Topic 3 – Rationality and common knowledge (Ch-4)

Topic 4 – Pinning down beliefs – Nash Equilibrium (Ch-5)

Topic 5 – Mixed strategies (Ch-6)

Topic 6 – Dynamic games of complete information (Ch-7)

Topic 7 – Credibility and sequential rationality (Ch-8)

Topic 8 – Multistage games (Ch-9)

Topic 9 – Repeated games (Ch-10)

Topic 10 – Strategic bargaining (Ch-11)

Topic 11 – Static games of incomplete information (Ch-12)

If time permits, we can cover more topics.

Presentation: Paper reading will be assigned during the course. You need to prepare a class presentation based on your assigned paper. Papers will be assigned to you in due course of time.

Assignment: You also need to prepare writing (about 10-12 pages, A4 size, 11 font size in Times New Roman) based on some problem with application of game theory. As an example, the problem may be an extension of the paper that you will be presenting. Alternatively you might find some other paper interesting and make an extension of that. You may even come up with very original problem based on your reading of the subject. You can even discuss this writing plan with me in/out of lectures.

Marks distribution [tentative plan]:

Formal Exam: 60% (midterm1: 15%, midterm2: 15%, Major: 30%)

Presentation: 20%

Assignment: 10%

Attendance: 10%

Here are few papers for your optional reading during the course.

- Myerson (1999) "Nash Equilibrium and the History of Economic Theory" *Journal of Economic Literature* [link](#)
- Gibbons (1997) "An Introduction to Applicable Game Theory" *Journal of Economic Perspectives* [link](#)
- Binmore (1987) "Modeling Rational Players I" *Economics and Philosophy*, 3: 179-214.
- Brandenburger (1992) "Knowledge and Equilibrium in Games" *Journal of Economic Perspectives* [link](#)
- Rubinstein (1991) "Comments on the Interpretation of Game Theory" *Econometrica* [link](#)
- Schwalbe and Walker (2001) "Zermelo and the Early History of Game Theory" *Games and Economic Behavior* [link](#)

- [Reny \(1992\)](#) "Rationality in Extensive-Form Games" *Journal of Economic Perspectives* [link](#)
- [Kandori \(2008\)](#) "Repeated Game" in *The New Palgrave Dictionary of Economics*, 2nd ed.
- [Morris \(1995\)](#) "The Common Prior Assumption in Economic Theory" *Economics and Philosophy*, 11: 227-253.
- [Milgrom \(2008\)](#) "What the Seller Won't Tell You: Persuasion and Disclosure in Markets" *Journal of Economic Perspectives* [link](#)
- [McAfee and McMillan \(1987\)](#) "Auctions and Bidding" *Journal of Economic Literature* [link](#)
- [Camerer \(2008\)](#) "Behavioral Game Theory" in *The New Palgrave Dictionary of Economics*, 2nd ed.
- [Fehr and Schmidt \(2006\)](#) "The Economics of Fairness, Reciprocity and Altruism – Experimental Evidence and New Theories" Chapter 8 of *Handbook on the Economics of Giving, Reciprocity and Altruism* [link](#)
- [Camerer, Loewenstein and Prelec \(2005\)](#) "Neuroeconomics: How Neuroscience Can Inform Economics" *Journal of Economic Literature* [link](#)
- [Roth \(2002\)](#) "The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics" *Econometrica* [link](#)
- [Roth \(2008\)](#) "What Have We Learned from Market Design?" *Economic Journal* [link](#)