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Game Theory

Course Description:

We cover main ideas and techniques of game theoretic analysis. The course introduces the basic intuition of game theory and its application. Furthermore, we will discuss the consequences of new development of behavioral assumptions. The goals of the course are to provide students with a foundation to game theory that helps strategic and critical thinking and to let them apply its intuition to solve real world problems.

Prerequisites:

Basic knowledge of intermediate microeconomics is required.
It is also recommended that you have also taken Advanced Microeconomics 1 and undergraduate Game Theory course.
A basic background of mathematics and (social) psychology is helpful but not necessary.

Logistics:

Lecturer: Young Joon Park
Office Hours: TBD
Teaching Assistant and TA office Hours: TBD
Lectures: The class will meet regularly on Mondays and Thursdays 3:30pm-5:20pm at room 231
CMS: I use course management system (http://cms.phbs.pku.edu.cn) for the course page. More information will be distributed in class.

Textbook:

The course is divided into two parts.
In the first 5 to 6 weeks, we will cover basic analytical tools in strategic situations. During the remaining time, we will extend these analytical tools to behavioral game theory, which applies recently proposed behavioral assumptions to the framework. There is also an option to cover different topics of game theory including Asymmetric Information and Signaling Game. We will discuss the possible options when necessary. There is no assigned textbook for the class. Instead, I will handpick the topics, which I believe interesting, useful, and insightful. For each topic, there are directly related references. For beginners, I recommend buying at least one reference book. The language in which the book of your choice is written does not matter.

[1] Zhiyong Tu, *Game Theory*, Peking University Press, 2009.
[2] Joel Watson, *Strategy: An Introduction to Game Theory*, Norton, 2008.
[3] Jean-Jacques Laffont & David Martimort, *The Theory of Incentives: The Principal-Agent Model,* Princeton University Press, 2002.
[4] Colin F. Camerer, *Behavioral Game Theory: Experiments in Strategic Interaction*, Princeton, 2003.
[5] Nick Wilkinson, "*An Introduction to Behavioral Economics*", Palgrave Macmillan, 2008.
[6] Colin F. Camerer, George Loewenstein, and Mattew Rabin, editors, *Advances in Behavioral Economics*, Princeton, NJ: Princeton University Press, 2003.
[7] John H. Kagel and Alvin E. Roth, *The Handbook of Experimental Economics*, Princeton, 1995
[8] Andreu Mas-Colell, Michael Whinston, and Jerry Green, Microeconomic Theory, Oxford University Press, 1995.
[9] Geoffrey A. Jehle and Phillip J. Reny, Advanced Microeconomic Theory, Prentice Hall, 2011.

For the first part, you may consult any game theory textbook (including [1] or [2]). I will consult [3] mostly on topics of asymmetric. For the second part, [4] is a good textbook that concentrates on behavioral game theory topics. [5] is a good general textbook that broadly covers various behavioral topics. [6] and [7] are collection of seminal papers in the field. You can also easily find chapters of game theory in most graduate microeconomic textbooks like [8] or [9].

Grading:

Your grade will depend on two exams and other miscellaneous evaluation:

1) Midterm Exam (35%)
2) Final Exam (50%),
3) Attendance and class participation (15%)

The exact time of the exam will be announced later.
The midterm exam will take place in week 4 or 5.
The final exam is cumulative.
The weight of each exam is determined and not negotiable.
There is no make up exam.
Attendance will be marked periodically.
Each absence without approval is worth 1% deduction of your final score.
Class participation will also be evaluated by several in-class experiments.

Problem Sets:

I will give you several problem sets that are not going to be graded.

Game theory can be complicated and abstract. You will not understand the material by just coming to class. Game theory can only be learned well through practice, so it is important that you work through the examples and spend time solving problems.
The purpose of the problem sets is to help you check your understanding of the materials. It will also be handy in preparing for the exams because some of the exam questions will be similar (or even identical) with those in the problem sets.
You will also get the answer keys to check your understanding.

Academic Honesty:

I take violations of academic honesty seriously. Any act of academic dishonesty (eg. cheating or plagiarism) will be reported to the dean's office as well as discipline committee, will lead to a failing grade in the course, and will possibly cause more serious consequences.

(Very Tentative) Schedule:

The schedule is tentative and due to changes.
The chapters and reading materials are provided for your reference.

Week 1 Introduction and basic concepts of Game Theory

[2] Chapter 1, 2, 3, 4, 5
[8] Chapter 7

Week 2 Analysis of Static Games

[2] Chapter 6, 7, 9, 11
[8] Chapter 8 Section A-D

Week 3-4 Analysis of Dynamic Games and Equilibrium Refinement

[2] Chapter 14, 15, 18, 19, 22
[8] Chapter 9

Week 4-5 Games with Incomplete Information

[2] Chapter 24, 28
[8] Chapter 8 Section E

Week 6-8 Asymmetric Information and Signaling Game (optional)

[2] Chapter 25, 27, 29
[3] Chapter 2-4

[8] Chapter 13, 14

Week 6 Introduction to Behavioral Game Theory

[4] Chapter 1, “Introduction”; Appendix 1.1, “Basic Game Theory”; and Appendix 1.2, “Experimental Design”
[6] Chapter 13, Colin F. Camerer, “Behavioral Game Theory: Predicting Human Behavior in Strategic Situations”
- Richard H. Thaler, “From Homo Economicus to Homo Sapiens”, Journal of Economic Perspectives, 2000, vol. 14.
- Matthew Rabin, “Psychology and Economics,” Section 2, Journal of Economic Literature, March 1998.
- Stefano DellaVigna, “Psychology and Economics: Evidence from the Field,” Section 2.3 Journal of Economic Literature, June 2009.

Week 6-7 Survey of experiments in Game Theory

[4] Chapter 2, Dictator, Ultimatum and Trust game
- James Andreoni, Marco Castillo and Ragan Petrie, "What do Bargainers' Preferences Look Like? Exploring a Convex Ultimatum Game." *American Economic Review,* 93(3), June 2003, 672-685.

Week 8 Social Preference

[6] Chapter 9, Ernst Fehr and Klaus M. Schmidt, “A Theory of Fairness, Competition, and Cooperation”
[6] Chapter 10 Matthew Rabin, “Incorporating Fairness into Game Theory and Economics”
- Joel Sobel, “Interdependent Preferences and Reciprocity” Journal of Economic Literature, June 2005
- Ernst Fehr and Klaus M. Schmidt, “The Economics of Fairness, Reciprocity and Altruism – Experimental Evidence and New Theories,” in Handbook of the Economics of Giving, Altruism and Reciprocity, Edited by S. Kolm and J.M. Ythier. July 2006, North Holland

Week 9 Initial Responses to Games

[6] Chapter 12, Vincent P. Crawford, “Theory and Experiment in the Analysis of Strategic Interaction”
[4] Section 4.1, Unstructured Bargaining; 4.2, Structured Bargaining; Chapter 5, Dominance-Solvable Games; and Chapter 7, Coordination
- Rosemarie Nagel, “Unraveling in Guessing Games: An Experimental Study,” *American Economic Review* 85 (1995), 1313-1326
- Miguel Costa-Gomes and Vincent Crawford, “Cognition and Behavior in Two-Person Guessing Games: An Experimental Study,” *American Economic Review* 96 (December 2006), 1737-1768

- Camerer, Colin, Ho, Teck-Hua and Chong, Juin Kuan, "A Cognitive Hierarchy Model of Games," *Quarterly Journal of Economics* 119 (2004), 861-898;
- Vincent Crawford and Nagore Iriberri, "Fatal Attraction: Focality, Naivete, and Sophistication in Experimental Hide-and-Seek Games," American Economic Review, 97 (2007),
- Alvin Roth, Vesna Prasnikar, Masahiro Okuno-Fujiwara, and Shmuel Zamir, "Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An Experimental Study," *American Economic Review* 81 (1991), 1068-1095.
- Judith Mehta, Chris Starmer, and Robert Sugden, "The Nature of Salience: An Experimental Investigation of Pure Coordination Games," *American Economic Review* 84 (1994), 658- 674.
- Vincent Crawford, Uri Gneezy, and Yuval Rottenstreich, "The Power of Focal Points is Limited: Even Minute Payoff Asymmetry May Yield Large Coordination Failures," American Economic Review, 98 (2008)
- Vincent Crawford "Adaptive Dynamics in Coordination Games," *Econometrica* 63 (January 1995), 103-143: Section 2, pp. 106-109