

Sabanci University
Faculty of Arts and Social Sciences

POLS 434/534: Formal Modeling and Political Analysis

INSTRUCTORS:

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COURSE DESCRIPTION

This course is a graduate level introduction to game theory for social sciences. Game theory consists of a coherent set of concepts and analytical tools to examine interactions between decision-makers, that is, situations where the well being of one decision-maker depends not only what she does but also on what others do. Game theory has become a widely used tool of analysis in a wide range of disciplines, including economics, political science, law, and international relations.

The course covers the standard group of essential concepts that are particularly important in game theory. It starts with an introduction to decision theory, also focusing on the plausibility of the rational choice assumption as a representation of real-life choices. It then discusses non-cooperative games, both with simultaneous and sequential moves. Time permitting, the course will finish with a discussion of incomplete information games.

Throughout the course, we will also cover applications of game theory to social sciences, particularly political science.

This course presupposes no knowledge of mathematics beyond simple arithmetic. It, however, requires students to think and reason in an analytically rigorous and systematic manner.

ONLINE LECTURES

Lectures will be online and synchronized. Lectures will be conducted as if students are in the class, and the board will be used as usual. Students are expected to attend the lectures and participate (the participation grade will take into account both). We may use either Google Meet or Zoom. Video recordings of the lectures will be posted on Sucourse+ for student access.

TEXTBOOK

The textbook for this course is

Martin Osborne, *An Introduction to Game Theory*, Oxford University Press 2004 (Os).

The following books will be useful for additional reading

Robert Gibbons, *Game Theory for Applied Economists*. Princeton, 1992

Avinash Dixit and Barry Nalebuff, *Thinking Strategically*, Norton, 1991

HOMEWORKS AND GRADING

Reading assignments and exercises will be handed out every two weeks.

Grading:

Homeworks/quizzes	20%
Participation	10%
Midterm	35% (November 16)
Final exam	35%

RULES OF CONDUCT

Students are strongly encouraged to cooperate in homeworks.

A student who (i) does not turn in a homework or (ii) is not present during the start of a quiz will be given a grade of 0. If you have a good reason for not attending a particular quiz, please produce relevant documentation for your absence.

Make-up exams are granted only in case of a valid and documented reason (in which case the instructor reserves the right to choose between a make-up exam and a transfer of the first midterm's credits to the second midterm). Absence in exams without any valid documented reason will result in a 0 from that exam. In case of an illness, the student is required to produce a formal *doctor's note from a hospital within five business days of the report's termination*. (A doctor's note taken from a doctor's private practice does not count as formal.) In case of private hospitals, the doctor's note has to be *verified by the university health service within five business days*.

The definition for scholastic dishonesty is given in the rules and regulations of the Sabanci University. In the case of scholastic dishonesty, no credits will be given for that particular work. Cheating during written work will result in an F for the course. All incidents of scholastic dishonesty will be reported to FASS for disciplinary action.

A student who does not attend at least 60% of the lectures will automatically receive an NA grade from the course.

COURSE OUTLINE

1. Rational Choice

a. Rationality assumption, preferences and utility

b. Reading assignment:

Tversky, Amos and Daniel Kahneman, 1981, "The Framing of Decisions and the Psychology of Choice", *Science*, New Series, Vol. 211, No. 4481, pp. 453-458.

Kahneman D., Knetsch, JL, and R Thaler, 1991, Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias, *Journal of Economic Perspectives*, Vol. 5, No. 1, pp. 193-206.

Herbert A Simon, 1995, "Rationality in Political Behavior", *Political Psychology*, Vol. 16, No, 1, pp. 45-61.

2. Modeling

a. Constructing a normal form game

b. Well-known games

c. Application: Arce, Daniel and Todd Sandler, 2005, "Counterterrorism: A Game-Theoretic Analysis", *Journal of Conflict Resolution* 49(2): 183-200.

d. Application: Tsebelis, George, 1989, "The Abuse of Probability Analysis: The Robinson Crusoe Fallacy", *American Political Science Review*, Vol. 83, No.1, pp. 77-91.

e. Application: Mark Lichbach. 1990. "Will Rational People Rebel Against Inequality? Samson's Choice." *American Journal of Political Science*, Vol. 34, No. 4. (Nov., 1990), pp. 1049-1076.

3. Analysis in pure strategies

a. Domination,

b. Nash equilibrium

c. Application: Arce, Daniel and Todd Sandler. 2005. "Counterterrorism: A Game-Theoretic Analysis." *Journal of Conflict Resolution* 49(2): 183-200.

d. Application: Geddes, Barbara, 1991, "A Game Theoretic Model of Reform in Latin American Democracies", *American Political Science Review*, Vol. 85, No. 2, pp. 371-392.

4. Mixed strategies

a. Analysis on simple games

b. Application: Palfrey and Rosenthal (1985)'s model in McCarthy, Nolan and Adam Meirowitz, 2007, *Political Game Theory: An Introduction*, New York, NY: Cambridge University Press, pg 140

November 16 MIDTERM

5. Continuum strategy sets
 - a. Best response analysis
 - b. Application: Hotelling model in McCarthy, Nolan and Adam Meirowitz, 2007, *Political Game Theory: An Introduction*, New York, NY: Cambridge University Press, pg 101-107

6. Extensive form games with perfect information
 - a. Extensive form
 - b. Sub-game Perfect Nash Equilibrium
 - c. Application: Przeworski, Adam. 1991. *Democracy and the Market: Political and Economic Reforms in Eastern Europe and Latin America*, New York, NY: Cambridge University Press, Chapter 2.
 - d. Application: Ulfelder, Jay, 2010, *Dilemmas of Democratic Consolidation: A Game-theory Approach*, First Forum Press, Chapter 2

7. Extensions
 - a. Combining sequential and simultaneous moves
 - b. Continuum of actions
 - c. Application: Weingast. Barry R. 1997. "The Political Foundations of Democracy and the Rule of Law." *American Political Science Review* 91(2): 245-263.
 - d. Application: Rubinstein, Ariel. 1982. "Perfect Equilibrium in a Bargaining Model." *Econometrica* 50: 97-110.