Sabanci University
Faculty of Arts and Social Sciences

POLS 434/534: Formal Modeling and Political Analysis

INSTRUCTOR:

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Meetings: Thursdays, 10:40-13:30, FENS L035

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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.

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

Problem sets will be handed out approximately every three weeks.

Grading:

Problem sets	20%
Participation	10%
Midterm	35% (November 23)
Final exam	35% (TBA)

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.
    Herbert A Simon, 1995, "Rationality in Political Behavior", *Political Psychology*, Vol. 16, No, 1, pp. 45-61.
    Lichbach, Mark I., 2003, *Is Rational Choice Theory All of Social Science?* University of Michigan Press, Chapter 3, 28-40 (e-book)

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

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

MIDTERM

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.