

University of Rochester Political Science

PSC 281
Formal Models in Political Science

Prof. Mark Fey
Spring 2007

Syllabus

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Office Hours: Friday, 1:30-3:00

This course is an introduction to the use of mathematical models in the study of politics. We will survey a broad range of models that are applicable to many aspects of political science. The types of models that we will consider are all parts of “positive political theory,” which can be further subdivided into social choice theory and game theory. The course rests on the premise that positive political theory (also known as formal theory, rational choice, or the economic approach to politics) can offer insights to those who want to better understand why and how political actors behave the way they do. We will use both strategic and nonstrategic models to further our understanding of political events.

I have set two goals in teaching this course. First, I want to introduce students to the tools of positive political theory using a number of classic political situations ranging from voting, legislative politics, and political campaigns to the comparison of electoral systems, collective action and political participation, and international relations. Second, and as important, I want to show students how positive political theory allows us to sharpen our intuitions and provides us with new ways of looking at familiar topics. In short, this course will try to offer those interested in politics a new way of thinking about political institutions and political behavior, and show those interested in positive political theory a broad and fertile area in which its tools have many applications.

While there are no formal mathematical prerequisites for the course, some familiarity with mathematical reasoning and logic is helpful.

Course Meetings: Lectures for the course will be twice weekly, Tuesdays and Thursdays at 2:00 in Meliora 219.

Course Work: Student performance will be evaluated on the following activities:

1. A 1-2 page paper on each of the ten readings below marked with ** These short papers should summarize what the main question is that the reading asks, how the reading answers this question, and how effective the argument of the reading is. These short papers are due at the beginning of class. Late work will not be accepted, but I will drop the lowest score from the papers over the course of the semester. (40%)

2. An in-class midterm on a date to be announced. (30%)

3. An 10-15 page paper due at the end of the semester that demonstrates an ability to develop and apply formal modeling skills. This can be an original model, a modification of an existing model or an new application of an existing model. (30%)

Course Readings: The two required texts for the course are available at the campus bookstore. Additional readings will be distributed during the semester. The two required texts are *Analyzing Politics*, by Ken Shepsle and Mark Bonchek, and *Games of Strategy*, by Avinash Dixit and Susan Skeath.

Below are the scheduled readings for the course. Naturally, this schedule may change as the semester unfolds.

Topic 0 Logistics

Topic 1 Rationality and Rational Choice

- Shepsle & Bonchek, Chapter 1 (pp. 5–14)
- McCubbins and Thies, “Rationality and the Foundations of Positive Political Theory” ([link](#))

Topic 2 Information Aggregation and Democratic Theory

- ** Grofman and Feld, “Rousseau’s General Will: A Condorcetian Perspective,” *American Political Science Review*, Vol. 82, No. 2. (Jun., 1988), pp. 567-576 (JSTOR)
- selections from Surowiecki, *The Wisdom of Crowds*

Topic 3 Individual Preference and Voting Rules

- Shepsle & Bonchek, Chapter 2, pp. 15–31, Chapter 3 (pp. 39–48) and Chapter 7 (pp. 166–191)
- Alan D. Taylor, *Mathematics and Politics*, New York: Springer-Verlag, 1995, secs. 5.2–5.3 & 5.6–5.8.

Topic 4 Cyclical Majorities, Agenda Control, and Voting Paradoxes and Applications to Political Development

- Shepsle & Bonchek, Chapter 4, pp. 49–62
- selections from Aldrich, *Why Parties?*

Topic 5 Thinking Abstractly about Voting: Arrow and May

- Shepsle & Bonchek, Chapter 4, pp. 63–81

Topic 6 The Spatial Model of Voting

- Shepsle & Bonchek, Chapter 5
- Duncan Black, “On the Rationale of Group Decision-making,” *Journal of Political Economy*, Vol. 56, No. 1. (Feb., 1948), pp. 23-34. (JSTOR)

Topic 7 Applications of Spatial Voting: The Setter Model and Models of Legislatures, Diplomacy, Bush v. Gore

- Shepsle & Bonchek, Chapter 5, pp. 115–136
- ** Putnam, “Diplomacy and Domestic Politics: The Logic of Two-Level Games,” *International Organization*, Vol. 42, No. 3. (1988), pp. 427-460. (JSTOR)
- Abramowicz and Stearns, Beyond Counting Votes: The Political Economy of Bush v. Gore, 2001, George Mason Law and Economics Research Paper No. 01-09. (link)

Topic 8 Measuring Voting Power

- Shapley and Shubik, “A Method for Evaluating the Distribution of Power in a Committee System,” *American Political Science Review*, Vol. 48, No. 3. (1954), pp. 787-792. (JSTOR)
- Steven Brams, *Game Theory and Politics*, Ch. 5

Topic 9 Models of Diversity

Topic 10 Utility Theory and Applications to Voting, Cheating, and Surprise

- Shepsle & Bonchek, Chapter 2, pp. 31–35

- ** Robert Axelrod, "The Rational Timing of Surprise," *World Politics*, Vol. 31, No. 2. (1979), pp. 228-246. (JSTOR)
- Matthew Woessner, "Beating the House: How Inadequate Penalties for Cheating Make Plagiarism an Excellent Gamble," *PS Political Science and Politics*, April 2004. (link)

Topic 11 Extensive Form Games, Backward Induction, and Applications to Environmental Management and Economic Development

- Dixit & Skeath, Chapters 1-3
- ** Carlson and Wilson, "Beyond zero-sum: game theory and national forest management," *The Social Science Journal*, Volume 41, Issue 4, , 2004, Pages 637-650. (link)
- Thad Dunning, "Resource Dependence, Economic Performance, and Political Stability," *Journal of Conflict Resolution*, Vol. 49, No. 4, 451-482 (2005) (link)

Topic 12 Strategic Form Games, Nash Equilibrium, and Applications to Political Reform and Terrorism

- Dixit & Skeath, Chapters 4 & 5
- Barbara Geddes, "A Game Theoretic Model of Reform in Latin American Democracies," *American Political Science Review*, Vol. 85, No. 2. (Jun., 1991), pp. 371-392. (JSTOR)
- ** Todd Sandler, "Collective Versus Unilateral Responses to Terrorism," *Public Choice*, Jul 2005, Vol. 124, pg. 75 (link)

Topic 13 Mixed Strategies

- Dixit & Skeath, Chapters 7 & 8
- ** George Tsebelis, "The Abuse of Probability In Political Analysis: The Robinson Crusoe Fallacy," *American Political Science Review*, Vol. 83, No. 1. (Mar., 1989), pp. 77-91. (JSTOR)

Topic 14 Cooperation and Repeated Games

- Dixit & Skeath, Chapter 11
- Shepsle & Bonchek, Chapter 8 (pp. 197-219)

- ** Robert Axelrod. *The Evolution of Cooperation*. New York: Basic Books, 1984, chaps. 1–3.

Topic 15 Commitment, Credibility, and Coordination

- Dixit & Skeath, Chapter 10

Topic 16 Collective Action and Public Goods

- Shepsle & Bonchek, Chapter 9 (pp. 220–259) and Chapter 10 (pp. 260–296)
- Dixit & Skeath, Chapter 11, pp. 356–392
- Garrett Hardin, “The Tragedy of the Commons,” *Science, New Series*, Vol. 162, No. 3859 (Dec. 13, 1968) , pp. 1243-1248. (link)
- Michael Laver, *Private Desires, Political Action*, Ch. 3
- ** Grossman, “The Dilemma of Prisoners: Choice during Stalin’s Great Terror, 1936-38,” *Journal of Conflict Resolution*, Vol. 38, No. 1. (1994), pp. 43-55. (JSTOR)
- Mark Lichbach, “What makes Rational Peasants Revolutionary?,” *World Politics*, Vol. 46, No. 3. (Apr., 1994), pp. 383-418 (JSTOR)

Topic 17 Tipping Models

- ** Rasma Karklins and Roger Petersen, “Decision Calculus of Protesters and Regimes: Eastern Europe 1989,” *The Journal of Politics*, Vol. 55, No. 3. (Aug., 1993), pp. 588-614. (JSTOR)

Topic 18 Models of Bureaucracy and Delegation

- Shepsle & Bonchek, Chapter 13 (pp. 345–379)

Topic 19 Models of Leadership and Authority

- Shepsle & Bonchek, Chapter 14 (pp. 380–404)

Topic 20 Models of Courts and Judges

- Shepsle & Bonchek, Chapter 13 (pp. 405–431)

Topic 21 Models of Coalitions and Cabinet Government

- Shepsle & Bonchek, Chapter 16 (pp. 432–456)
- Michael Laver, *Private Desires, Political Action*, Ch. 7

Topic 22 Games and Information and Applications to Voting and War

- Dixit & Skeath, Chapter 9
- ** James D. Fearon, “Rationalist Explanations for War”,
International Organization, Vol. 49, No. 3 (Summer), 1995: 379-414.
(JSTOR)