
Political Science 5800

Game Theory and Political Science

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Office: 305 Perelman Center for Political Science and Economics

Office Hours: TBA

Classroom: TBA

TBA

This course provides an introduction to non-cooperative game theory and its applications to political science. By the end of the semester, students should be able to read and critically assess published game-theoretic work in political science journals, and should be able to apply the logic of game theory to strategic contexts. The course covers the basic concepts of game theory, including Nash equilibrium and its major refinements, simultaneous and sequential games, repeated games, and games of private information. In addition, we will cover some of the central models used in political science, notably models of public choice (such as the median voter theorem) and models of bargaining and conflict.

Course Assignments

When you have learned to use it, you will find that game theory provides a remarkably powerful tool for thinking about strategic interaction. Building intuition in game theory, however, requires solving models oneself. For this reason, a central assignment will be weekly problem sets. While published game-theoretic work frequently makes use of differential and integral calculus, you will not be asked to use anything more complicated than high-school algebra in solving problems. If you have questions about your math background or preparation for the course, please feel free to talk with me.

The problem sets will be posted on Canvas prior to lecture on Tuesdays and will be due (through Canvas) by noon on the following Monday. While some students choose to type out answers to problem sets, you are welcome to submit a scanned copy of handwritten answers, so long as the scan is legible and the document is submitted as a single file. I encourage you to work in groups of 2-4 students on the problem sets. I require however that you write and submit your own problem set and that you identify the students with whom you worked. While I encourage group work, you will benefit most from group interaction if you attempt to do all problems before meeting with the group and if you verify that you can replicate the group's final answer before turning the problem set in. Late problem sets will be accepted only under exceptional circumstances and with prior approval, and no problem sets will be accepted after class on Tuesday (when we will discuss the answers). I will however drop your lowest problem set score when calculating your grade.

In addition, there will be in-class closed-book/note midterm and final exams, which will involve both solving specific models and answering more general questions about game theory as a method and its applications to politics. Sample exams from a previous semester are posted on the course Canvas page. The midterms will be held on *** and ***, and the final exam will take place at Penn's designated time for final exams.

The other significant assignment will be a presentation of a published game-theoretic political science article. Your presentation should summarize and critique the article, presenting the core assumptions and key findings, and then discussing the strengths and weaknesses of the article. We will discuss a couple articles earlier in the semester, which should help with understanding the goal of the assignment; I will provide more information about expectations in November.

Assignment	Due Date	Share of Grade
Problem Sets	Weekly	15%
Midterm Exam I	***	15%
Midterm Exam II	***	20%
Article Presentation	Early December	15%
Participation and Minor Assignments	Various	10%
Final Exam	TBA	25%

The course textbook is *Strategy: An Introduction to Game Theory*, by Joel Watson. We are using the third edition of the textbook, which is readily available from online retailers. In addition, there are articles assigned in connection with the substantive topics; these articles are available on the course Canvas site.

Course Plan

To increase flexibility, the syllabus lists topics in the order in which we will cover them, but without specific dates listed for topics. I will indicate when we move from one topic to another as we progress through the course so that you know when you should do the readings in a given topic. That said, there are some fixed dates. The first midterm will take place on ***, by which point we should have covered the material through section 2 of the course. The second midterm will take place on ***, and will cover material through section 4.

Section 1: An Introduction to Game Theory

- Watson, ch. 1-5

Section 2: Nash Equilibrium in Complete Information Games

Nash Equilibrium in Normal Form Games: Pure and Mixed Strategy Equilibrium

- Watson, ch. 6-7, 9, 11

Extensive Form Games and Subgame Perfect Equilibrium

- Watson, ch. 14-15

Repeated Games

- Watson, ch. 22

First Midterm Exam on September 29!

Section 3: Public Choice

Voting Systems

- John W. Patty and Elizabeth Maggie Penn, *Social Choice and Legitimacy: The Possibilities of Impossibility*, ch. 2-3.

The Median Voter Theorem

- Bernard Grofman, “Downs and Two-Party Convergence,” *Annual Review of Political Science* 7 (2004), 25-46.

Public Choice and Autocracies

- Beatriz Magaloni, “The Game of Electoral Fraud and the Ousting of Authoritarian Rule,” *American Journal of Political Science* 54:3 (2010), 751-765.

Section 4: Models with Private Information

Bayesian Nash Equilibrium

- Watson, ch. 24, 26-27

Signaling and Perfect Bayesian Equilibrium

- Watson, ch. 28-29

Second Midterm on November 10!

Section 5: Bargaining and Conflict

- Watson, ch. 28-29
- James D. Fearon, “Rationalist Explanations for War,” *International Organization* 49:3 (1995), 379-414.
- Peter Schram, “Hassling: How States Prevent a Preventive War,” *American Journal of Political Science*, 65:2 (2021), 294-308.

Section 6: Presentations of Published Models

Section 7: Conclusions and Reflections

Final Exam on scheduled date TBA