

Political Science 835: Game Theory and Political Analysis

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University of Wisconsin-Madison

December 13, 2021

Course Information

Class Time: Monday, 3:30-5:25 pm (Central Time)
Class Location: 422 North Hall

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Office Hours: Wednesdays 1:30-3:30

Course Description

This course is an introduction to game theory in political science. The focus will be on learning the methodology, but applications from American politics, comparative politics, political theory and international relations will be examined throughout the course, reflecting the prevalence of similar strategic issues across fields. Topics will include utility theory, normal form games, extensive form games, repeated games, incomplete information. Grades will be based on problem sets and a final exam.

Learning outcomes

By the end of the semester, you should be able to:

- Analyze strategic and extensive games of perfect and imperfect information
- Identify the game theoretic foundations of strategic arguments made informally
- Read and understand many formal-theory articles

Textbook

The textbook for the course is the following.

- Tadelis, Steven, 2013. *Game Theory: An Introduction*. Princeton University Press.

Course Requirements

The grade for the course will be determined by problem sets and a final exam. The exam will be made available on Canvas after the last class and be due the following Friday, December 17, at midnight.

There will be weekly problem sets, 14 in total, drawn from the exercises in the text book. In general, one cannot learn game theory without doing problems. Do not be tempted into easing back for a problem set or two, with the thought that you can catch up later. This material is like a train: if you get off at one station, you will find it very difficult to get back on at the next. Do work in groups, but ideally only after you have already attempted to solve the problems on your own. Please contact me when you have questions. I will be happy to go over problems from the previous week at the beginning of class.

The problem sets must be done in LaTeX. This has become the standard typesetting program for technical papers involving mathematical equations. This is a good opportunity to learn some basic LaTeX skills. I use TexShop which is an implementation of TeX on Mac platforms. Make the output files pdfs. I will circulate a template with some commonly used equations and formatting tools that you can use for the problem sets.

The name of the files you submit must adhere to the following naming convention: Your-Name#.pdf. So if your name is Kathleen Hanna, your second problem set will be titled “Hanna2.pdf”. That way they are easy for us to keep track of.

Answers to some of the exercises are available online. I urge you to check the answers only after you make a good faith effort on your own and turn in your work, so that both you and I have a sense of how you are doing in the course and what material is hard or easy.

Problem sets will be graded as follows.

4 points	All correct
3 points	Mostly correct
2 points	Half correct
1 point	Mostly incorrect
0 points	Not turned in

The grade for the course will be determined as follows.

Problem Sets	56%
Final Exam	44%
Total	100%

Remote Access

For students at other campuses and those who want to attend remotely, I will establish a zoom link for you to log in to class.

Schedule: Fall Semester 2021

Part 1: Rational Decision Making

1	Sept. 13	The Single Person Decision Problem	Ch. 1	Ex. 1.1, 1.2, 1.3, 1.4
2	Sept. 20	Uncertainty and Time	Ch. 2	Ex. 2.1, 2.2, 2.3, 2.4

Part 2: Static Games of Complete Information

3	Sept. 27	Normal Form Games	Ch. 3	Ex. 3.2, 3.3, 3.4, 3.7
4	Oct. 4	Rationality and Common Knowledge	Ch. 4	Ex. 4.5, 4.6, 4.7, 4.10
5	Oct. 11	Nash Equilibrium	Ch. 5	Ex. 5.4, 5.6, 5.7, 5.15
6	Oct. 18	Mixed Strategies	Ch. 6	Ex. 6.2, 6.4, 6.6, 6.11

Part 3: Dynamic Games of Complete Information

7	Oct. 25	Extensive Form Games	Ch. 7	Ex. 7.2, 7.4, 7.5, 7.7
8	Nov. 1	Credibility and Rationality	Ch. 8	Ex. 8.1, 8.2, 8.10, 8.12
9	Nov. 8	Multistage and Repeated Games	Chs. 9, 10	Ex. 9.1, 9.3, 10.2, 10.3
10	Nov. 15	Bargaining	Ch. 11	Ex. 11.1, 11.2, 11.4, 11.5

Part 4: Incomplete Information

11	Nov. 22	Bayesian Games	Ch. 12	Ex. 12.1, 12.3, 12.5, 12.8
12	Nov. 29	Sequential Rationality	Ch. 15	Ex. 15.1, 15.2, 15.3, 15.4
13	Dec. 6	Signaling Games	Ch. 16	Ex. 16.1, 16.2, 16.6, 16.8
14	Dec. 13	Cheap Talk	Ch. 18	Ex. 18.1, 18.2, 18.3, 18.4

Dec. 17 Final Exam Due (11:59 pm)

Dec. 20 Final Problem Set Due (3:30 pm)