

# Syllabus for Political Science 118: Game Theory in Political Science

**Summer 2020**

(Last updated on June 24, 2020)

<b>Instructor:</b>	Sean Ingham	<b>Time:</b>	M.-Th. 9:30-10:50am
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<b>Office hours:</b>	10:50–11:30am, M-W		

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## Course description

This course introduces students to game theory and its applications in political science. It covers the concepts of Nash equilibrium and subgame perfect equilibrium and their application to the study of electoral competition, collective action problems, and agenda-setting, among other topics. The goals of the course are to give students a solid understanding of core concepts in game theory and their canonical applications in political science, and to sharpen students' problem-solving and analytical reasoning skills.

## Prerequisites

The course has no formal prerequisites and presupposes no mathematical knowledge beyond what is typically taught in high school (there is no calculus, for example). However, the material presents some of the same challenges as mathematics generally: special symbols and notation, abstract concepts, and the difficulty of careful analytical reasoning.

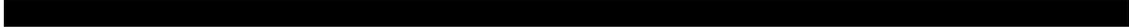
## Assignments and grades

The final grade reflects scores on weekly problem sets (30%), a midterm exam (30%), and a final exam (40%).

- *Problem sets.* There will be about four problem sets. Students are permitted to work on the problem sets in groups, but each student must write up and submit their own solutions, and a student must be prepared to explain their answers to the TA or instructor upon request.  
The deadlines for the problem sets are indicated on the schedule below. They should be submitted to the Canvas website before 9:30am, pacific time, on the day indicated.
- *Exams.* The midterm exam covers all the material from lectures and the problem sets prior to the date of the midterm exam. The final exam is cumulative and tests all material covered in lectures and the problem sets during the quarter.

## Zoom URL

To register for the recurring Zoom meeting, which takes place 9:30-10:50am, pacific time, M–Th., use the following url:



After registering, you will receive a confirmation email containing information about joining the meeting.

Zoom sessions will take place during the scheduled class time. They will be recorded and the recordings made available via Canvas.

## How to succeed in this course

- *Remote learning.* Taking classes remotely presents its own set of challenges. I recommend watching at least the first half of this video by a UCSD psychology professor for some tips on how to learn effectively in online classes:

<https://www.youtube.com/watch?v=1IIUVU-d1DM\&feature=youtu.be>

- *Preparing for the Zoom sessions.* You should read the assigned sections of the textbook and lecture notes and watch the assigned lecture videos (see schedule below) before coming to the Zoom meeting. You should use the Zoom meeting to ask questions about what you didn't understand.
- *How to read/watch.* When you sit down to read the textbook or the lecture notes, or to watch a lecture video, think of this activity as analogous to participating in a strenuous group exercise class. The text/notes/video are like the instructor of group exercise class. If all you do is read the text and watch the video, this is like passively watching the instructor as the instructor performs the exercises. That is to say, you're not going to benefit much. To get "fit," you need to participate in the exercises, not just watch passively from afar. You need to have a pencil and paper on hand as you read so that you can work through exercises and examples on your own. You should try to come up with your own examples, in addition to those given in the book or notes, to illustrate the abstract concepts being presented. This is the hard work that will actually create and strengthen the neural connections that produce understanding and problem-solving ability.
- *Mindset.* It's also important to have the right attitude. Be patient, adopt a growth mindset, and take personal responsibility for your education. When you are confused, do not blame the author. Go back and re-read, slowly, and figure out why you are confused. After re-reading the textbook and notes, consult with a peer, TA, or the instructor. To meet with the TA or instructor via Zoom, send an email.
- *How to study.* Do as many of the exercises in the textbook and lecture notes as you can. Try constructing your own exercises by making modifications to the games presented in the textbook or lecture notes and seeing whether the modifications affect your solutions, and why or why not. Try explaining your solutions and the definitions of game-theoretic concepts to a peer.

## Academic honesty

Please familiarize yourself with the university’s policies regarding academic integrity. Academic dishonesty will be punished to the maximal extent permitted by university policy. For more information about what constitutes academic dishonesty and the potential repercussions, see the information at the following link:

<https://academicintegrity.ucsd.edu/>

In this course, copying text from another student’s problem set and discussing the midterm exam or the final exam during the exam period constitute academic dishonesty. However, working on problem sets with other students is permitted—indeed, encouraged—but students must write up their own solutions.

## Required materials

We will use Martin Osborne’s *An Introduction to Game Theory*. The first three chapters are available on Osborne’s website:

<https://www.economics.utoronto.ca/osborne/igt/>

## Schedule

[1] **June 29.** Rational agents, preferences, and payoff functions

- Syllabus.
- Lecture notes, §§1–2
- Osborne, *Introduction to Game Theory*, 1.1, 1.2

*Assigned video:* “Rational agents, payoff functions”

[2] **June 30.** Concept of a strategic game; the Prisoner’s Dilemma

- Osborne, 2.1, 2.2
- Lecture notes, §§4–6

*Assigned video:* “The concept of a strategic game”

[3] **July 1.** Additional games; concept of a Nash equilibrium

- Osborne, 2.3–2.6
- Lecture notes, §§7–9

*Assigned video:* “Nash equilibria to strategic games,” “Additional simple games”

[4] **July 2.** Nash equilibria to simple games; stag hunt game

- Osborne, 2.7.1-2.7.4
- Lecture notes, §§10, 11
- **First problem set due**

*Assigned video:* “Stag hunt”

[5] **July 6.** Public goods provision; voter participation

- Osborne, 2.7.5-2.7.9
- Lecture notes, §§12–16

*Assigned video:* “Public goods provision,” “Voter participation”

[6] **July 7.** Dominant strategies; voting games

- Osborne, 2.9.1-2.9.4
- Lecture notes, §17

*Assigned video:* “Dominant strategies”

[7] **July 8.** Application to empirical inquiry: voter turnout.

- Richard Jankowski. 2018. “Altruism and Political Participation.” In *The Oxford Handbook of Public Choice*, selections tbd.
- Fowler, James. 2006. “Altruism and Turnout.” *The Journal of Politics* 68(3): 674–683.

[8] **July 9.** Electoral competition

- Osborne, 3.3, up until Exercise 72.1
- Lecture notes, §20
- **Second problem set due**

*Assigned video:* “Hotelling-Downs model of electoral competition”

[9] **July 13.** More models of electoral competition

- Exercise 72.3 (Electoral competition in two districts) in Osborne
- Exercise 73.1 (candidates who care about location of winning position) in Osborne
- Lecture notes, §§21, 22

*Assigned video:* “Elections with ideologically motivated candidates”

[10] **July 14.** Midterm exam

[11] **July 15.** Expected utility theory

- Osborne, 4.1
- Lecture notes, §23

*Assigned video:* “Expected utility”

[12] **July 16.** Nash equilibria in mixed strategies

- Osborne, 4.2, 4.3
- Lecture notes, §24
- **Third problem set due**

*Assigned video:* “Mixed strategies”

[13] **July 20.** Voter turnout, revisited

- Exercise 118.2 (Voter participation) in Osborne
- Osborne, 4.6
- Lecture notes, §25

*Assigned video:* “Voter turnout revisited”

[14] **July 21.** Extensive-form games; strategies in extensive-form games

- Osborne, 5.1, 5.2
- Lecture notes, §§26, 27

*Assigned video:* “Extensive-form games,” “Nash equilibria to extensive-form games”

[15] **July 22.** Nash equilibrium; backwards induction; subgame perfect equilibrium

- Osborne, 5.3, 5.4
- Lecture notes, §§28–30

*Assigned video:* “Backwards induction,” “Subgame perfect equilibrium”

[16] **July 23.** Ultimatum game; holdup game

- Osborne, 5.5, 6.1.1, 6.1.2
- Lecture notes, §§31, 32
- **Fourth problem set due**

*Assigned video:* “Ultimatum game”

[17] **July 27.** Agenda control

- Osborne, 6.1.3
- Lecture notes, §33

*Assigned video:* “Agenda control”

[18] **July 28.** Buying votes

- Osborne, 6.3
- Lecture notes, §34

*Assigned video:* “Buying votes”

[19] **July 29.** Application to empirical inquiry: experimental tests of altruism

- Nicholas Bardsley. 2008. “Dictator game giving: altruism or artefact?” *Experimental Economics* 11(2): 122–133.
- Steffen Andersen et al. 2011. “Stakes Matter in Ultimatum Games.” *American Economic Review* 101: 3427–3439.
- James Andreoni, Justin M. Rao, and Hannah Trachtman. 2017. “Avoiding the Ask: A Field Experiment on Altruism, Empathy, and Charitable Giving.” *Journal of Political Economy* 125(3): 625–653.

[20] **July 30.** Review session.

- **Fifth problem set due.**