Syllabus for ECON C110/POL SCI C135: Game Theory in the Social Sciences, Fall 2017

Instructor: Andrew Little, 736 Barrows Hall, andrew.little@berkeley.edu
Office Hours: Wednesday 11:00am-1:00pm.
(Link to sign up on my website www.andrewtlittle.com/teaching.)
Location: Tuesday/Thursday 9:30AM - 10:59am, F295 Haas Faculty Wing

Game theory is the (mathematical) study of strategic behavior. Loosely speaking, this means analyzing how people try to get what they want, which is complicated by the presence of other people pursuing *their* goals. If this sounds so broad as to apply to nearly all human behavior, it is! And this generality is why game theory has been applied so widely throughout the social sciences, particularly economics and political science.

In this class we will study some of the most influential and controversial of these applications. For example, how is it possible to get individuals, political parties, and countries to cooperate? Why are some dictatorships overthrown, while others last for generations? Why do people vote, and how to parties compete for their votes? How is this related to firms competing for customers?

The class will cover some of the mechanics of how to set up and solve game theory models, but the main focus will be on how the tool has been used to provide insight into social questions. While game theory is a mathematical discipline and having a strong background in math (particularly calculus and probability) will be helpful, I will not assume any knowledge beyond high basic algebra. More importantly, I ask that you are willing to work to understand the models, and be open-minded to the kind of analysis and assumptions they require.

General Policies

Textbook

The only text required for purchase is "An Introduction to Game Theory" by Martin Osborne. This will be supplemented by other readings which will be distributed via bcourses.

Evaluation

Final grades will be based on the following:

- Problem Sets: 30%. There will be around 5 problem sets.

- Midterm: 30%. Will be held during a class period, exact date TBD, best guess. It will likely be around October 5.

- Final: 40%. Held on Wednesday, December 13, 11:30am-2:30pm. If you can not take the exam at this time, you can not take the class.

Late Assignments

Extensions and permission to submit late work will only be granted in extenuating and unavoidable circumstances outlined to the instructors in writing prior to the due date in question. Such circumstances include medical or family emergencies. Multiple assignments from other courses scheduled for the same date – or other work commitments – do not constitute acceptable reasons for extensions, so please plan accordingly. Late assignments will be penalized a letter grade per day late.

Problem Sets and Collaboration

I encourage you to work together on the problem sets. Collaboration benefits both the receivers of help as well as the givers: being able to explain something to others is one of the best ways to truly master it. Three important guidelines for collaboration:

1. You should always spend some time trying to figure out the problems on your own before turning to others. This is both to keep a check on how well you understand the material, and because the initial stages of trying to crack a problem on your own are an important – if hard! – way on the path to understanding.

2. Your solution must be written in your own words.

3. If your solution to a problem comes from one of your classmates – and this is more than fine as long as you follow guidelines 1 and 2 – acknowledge them in your write up. For example "Sam G provided the general approach to solving part a"

Appealing Grades

If you believe your grade on an assignment does not reflect the quality of the work, you can appeal given the following guidelines:

- Wait 24 hours, but no more than a week after receiving the grade

- If you still would like to appeal, email your TA a clear and short explanation of why you believe the grade is incorrect. If necessary, they may consult me.

- We reserve the right to give a *lower* grade following any appeal

Laptops and Other Electronic Devices

Recent research has conclusively shown that students learn less when they have their laptops, even if just to take notes. Not only will having a laptop distract you, it also distracts those around you. (In fact, this is an excellent example of a collective action problem, one of the topics we will cover.) So, unless you have a pressing reason that is cleared by me, laptops are not to be used during class.

Similarly, phones must be turned off during class.

Accessibility Needs

If you have a condition that affects your ability to participate fully in class or to meet all course requirements, please speak with me after the first day of class so that we can work together to arrange appropriate accommodations. This syllabus and other course materials can be made available in alternate formats.

Schedule

The general organization of the class will be into 5 parts, analyzing a particular type of game or political situation. Each section will last about two to three weeks and have one corresponding problem set.

1 The Fundamentals: Individual and Group Preferences

1.1 Introduction, games

Overview of the class, playing some games.

1.2 Preferences, utility, rationality

Before analyzing strategic interactions between different people, we begin by thinking about what it means for choices to be optimal or rational for individuals.

Readings:

- Osborne 1.1-1.2

1.3 Group preferences(?)

Humans do not live in a vacuum. Now that we understand individual preferences, can we aggregate these to coherently talk about outcomes or policies preferred by *groups*? Hint: maybe.

Readings:

- Shepsle and Bonchek "Analyzing Politics", chapter 4

1.4 Application: spatial models of policy preferences: median voter theorem vs chaos

Many if not most policies are not yes/no questions, but more continuous choices: e.g., setting a tax rate, how many troops to send to a war, what degree of pollution to allow. The *spatial* model is how we generally think about preferences over these kinds of policies, and can have nice properties that get us out of the paradoxes of group choice.

Readings:

- Shepsle and Bonchek "Analyzing Politics", chapter 5

1.5 Application: expected utility, and is it rational to vote in first place?

Individual decision-making under uncertainty, with an application to the question of whether it is "rational" to vote. And does that question even make sense?

- William Riker and Peter Ordeshook, "A Theory of The Calculus of Voting"

2 Games; Cooperation and the (Repeated) Prisoner's Dilemma

An introduction to the formal representation of games and how we solve them. Nash Equilibrium.

2.1 Strategic Form Games

Readings

- Osborne 2.1-2.7

2.2 Best responses and Nash Equilibrium

An intuitive and useful way to solve games is to define the *best response* to others' behavior, and search for strategies that are mutual best responses. We apply this to political competition and and the famous "p-beauty contest"
Readings:

- Osborne 2.7-2.10

2.3 Applications: Competition in Pricing and Political Platforms

- Osborne Chapter 3 (in particularly 3.1 and 3.3)

2.4 Repeated PD and TFT

Back to the Prisoners' dilemma. What happens if we repeat the game over time?
Readings

- Osborne 14.1-14.7 (can skip 14.4)

2.5 Applications: The Folk Theorem, Climate Change, Democracy as an equilibrium

The logic of repeated games extends beyond the PD. One famous example looks at why competing political parties accept unfavorable election results.

- Osborne 14.8

- Adam Przeworski, "Democracy and the Market", chapter 1

2.6 MIDTERM

3 Sequential Games, Bargaining, and War

3.1 Sequential Games and Subgame Perfection

Games with an element of time. Ruling out making "non-credible threats".

- Osborne Chapter 5

3.2 Bargaining and The Ultimatum Game

A particularly important application is in bargaining games, where we may (or may not) expect people to be willing to reject deals that are better than nothing.
Readings

- Osborne 6.1

- Richard Thaler "Anomalies: The Ultimatum Game"

3.3 Application: Toughness in Bargaining

How can we get better deals in bargaining? Do we want to be "irrationally" tough?

- Thomas Schelling, "An Essay on Bargaining"

3.4 Application: Bargaining and War

War as a failure to reach a bargain.

- James Fearon, "Rationalist Explanations for War"

3.5 Application: Entry into Industry and Politics

Credibility also matters for firms deciding whether to enter a new industry, and potential candidates thinking about entering politics

- Osborne 7.1-7.3

4 Coordination, Collective Action, and Revolution

4.1 Varieties of Coordination Games

We first consider some different coordination games, where people generally want to take similar actions but may disagree on which is best
Readings

- Thomas Schelling, "The Strategy of Conflict", pages 53-67
- Roger Myerson "Fundamentals of Social Choice Theory" pages 305-308

4.2 Mass Protest as Coordination, the Threshold Approach

A slightly different take on mass action: what happens if you only want to participate if enough others do?

- Mark Granovetter, "Threshold Models of Collective Behavior"
- Malcolm Gladwell "Threshold of Violence"

4.3 Application: Preferences Falsification

How does coordination and pressure for conformity affect what we say about politics every day?

- Excerpt from Timur Kuran "Private Lies, Public Truths"

4.4 Application: Social Media and Protest

How does technology like social media help (or hurt) coordinating on protest?
Readings:

- Andrew Little "Communication Technology and Protest"

5 Communication and Signaling

5.1 Overview of Games of Imperfect Information

Many of the most interesting (and difficult!) ideas from game theory come out of models where the actors have different information. When is having extra information an advantage or disadvantage? When is honest communication possible?

Readings:

- Osborne 10.1-10.4

5.2 Cheap Talk

Most of our communication is relatively free: it doesn't directly cost me much to tell you one thing or the other about my opinions or any secret information I have. When is it possible to reveal secrets honestly?

Readings:

- Osborne 10.8

5.3 Signaling

When cheap talk won't work, sometimes we need to send costly signals that others wouldn't be willing to send in order to be believed.

- Osborne 10.7

5.4 Application: Adverse Selection and "Death Spirals"

One of the most important applications of asymmetric information is how it can cause markets to fail, whether what is for sale is a used car or health insurance.

Readings

- George Akerlof, "A Market for Lemons"

- TBD on Health Insurance

5.5 Other applications, time permitting