THE UNIVERSITY OF CHICAGO
Harris Public Policy

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PPHA 41101: Political Economy I: Introduction to Applied Game Theory

Autumn 2018
MW, 9:30 - 10:50am, Room 289B

Instructor:
Konstantin Sonin (ksonin@uchicago.edu)
Office: Room 185
Office hours: M 11am-12pm, W 1:30-2:30pm; at other time, by appointment through email.

If you send me an email, please have the prefix "PPHA 41101" in the Subject line.

Course Description:
This class is an introduction to game theory, a branch of applied mathematics, the primary tool of strategic analysis in economics, politics, international relations, and elsewhere. The course introduces basic concepts of game theory, and discusses applications to political economy issues.

Though I will give mathematically rigorous definitions and formally state all the results, some proofs, e.g. of the Nash existence theorem and the Folk Theorem, will be sketched, rather than fully exposed. A working command of basic calculus and probability is required, but that of real analysis is not.

Note that this class is a first part of a two-part sequence: the information-based models ("games with imperfect information") are covered in PPHA41102.

Textbooks:
I will mostly rely on Martin Osborne's *An Introduction to Game Theory* (Oxford UP, any edition), which contains a lot of examples, and Martin Osborne and Ariel Rubinstein's *A Course in Game Theory*, a bare-bones mathematical introduction to the subject, though you might find useful a number of other excellent textbooks.

I will use Scott Gehlbach's *Formal Models of Domestic Politics* (Cambridge UP, 2013), *Political Game Theory: An Introduction* (Cambridge UP, 2014) by Nolan McCarty and Adam Meirowitz, and *International Relations Theory: the Game-Theoretic Approach* by Andrew Kydd for applications in political economy.

Although this is not a required read, you will greatly benefit from reading Thomas Shelling's *The Strategy of Conflict* (any edition) and Kenneth Shepsle's *Analyzing Politics* (Norton, 2010), non-technical introductions into strategic analysis and formal political economy, respectively.

TA Sessions and Office Hours:
TA(s) will hold fortnightly sessions, which will last for one hour. In sessions, TA will explain solutions to problem sets and demonstrate how to work with sample exercises. In addition, TA will hold office hours each week. Use these office hours to ask questions that were not discussed in class or TA sessions.

Attendance:
You are expected to attend and participate in every class.

Slides:
I will try to post preliminary slides for each lecture on Canvas. After the lecture, the actual slides will be posted.

Problem Sets:
There will be four problem sets. You may discuss problems with each other, but you must turn in your own work.

Home assignments will be due electronically on Wednesdays before the class. You are strongly advised to use a formulae-processing software.

TAs will grade the problem sets on a scale of 1 to 100. Late home assignments will be heavily discounted.

Exams:
We will have a midterm exam in class on Monday, October 30, and a final exam on the finals week, December 10-14. The exams are going to be open-book, but you will not be able to use any communication devices.

Grades:
Your course grade will be based on the following weights: problem sets 25%, midterm exam 25%, and final exam 50%.

Please direct any re-grade requests to me rather than the TA(s). In such case, submit your work and a brief written explanation of your argument. Following this re-evaluation, your grade may go up or down.

Additional readings:
Occasionally, I will post additional reading, both academic and policy-related, on Canvas. You might read (or not read) them to get a better understanding of how concepts we discuss in class apply in policy analysis and public discourse.

Course Plan:

Lecture 1 (M 10/01): Strategic Analysis in Politics and Elsewhere
- Osborne, 1.1-1.3, , 2.1-2.5, 5.1-5.2, 6.1-6.2, 7.1

Lecture 2 (W 10/03): Games in Extensive Form
- Osborne, 5.1-5.2

Lecture 3 (M 10/08): Nash Equilibrium
- Osborne, 2.1-2.9

Lecture 4 (W 10/10): Nash Equilibrium in Extensive-Form Games
- Osborne, 5.3-5.5

Lecture 5 (M 10/15): A Model of Political Competition
- Osborne, 3.3

Lecture 6 (W 10/17): Committee Decision-Making
- Osborne, 7.4

Lecture 7 (M 10/22): Models of Public Choice
- Osborne, 3.1-3.2

Lecture 8 (W 10/24): Existence of Nash Equilibrium
- Osborne, 4.10

Lecture 9 (M 10/29): Solving for Nash Equilibrium in Normal-form Games
- Osborne, 4.10

Lecture 10 (W 10/31): The Concept of Bayesian Games
- Osborne, 9.1-9.3

Mid-term (M 11/05)

Lecture 11 (W 11/07): Repeated Games
- Osborne, 14.1-14.11

Lecture 12 (M 11/12): Folk Theorem
- Osborne, 14.1-14.11

Lecture 13 (W 11/14): Bargaining Games
- Osborne, 16.1-16.4

Lecture 14 (M 11/19): Markov Games and MPE

Lecture 15 (W 11/21): Coalition Formation
- Osborne, 8.1

Lecture 16 (M 11/26): Cooperative Games
- Osborne, 8.2-8.6

Lecture 17 (W 11/28): Social Choice

Lecture 18 (M 12/03): Matching
- Osborne, 8.7

Lecture 19 (W 12/05): Mechanism Design with Complete Information

Final Exam (TBD)