POLITICAL SCIENCE 505: THEORIES OF INDIVIDUAL AND COLLECTIVE CHOICE I

Washington University
Department of Political Science
Fall 2018
2:30-4:30PM Tuesday
Seigle 206

Instructor: Keith E. Schnakenberg
Email: keith.schnakenberg@gmail.com
Web: http://keith-schnakenberg.com/
Office Hours: By appointment
Seigle 241
Assistant Instructor: JB Duck-Mayr

This course provides an introduction to non-cooperative game theory and its application to research in political science. Students will learn how to represent static and dynamic games under complete and incomplete information and how to analyze them using appropriate methods and solution concepts. Applications to political science are emphasized as much as possible but the primary focus will be on gaining a solid foundation in game theory.

The textbook for this course is Martin Osborne's (2004) An Introduction to Game Theory. This is an ideal book for beginning students without significant mathematical background. Students who crave a more advanced references should consider purchasing Game Theory: An Introduction by Steven Tadelis. This is a good middle-of-the-road game theory text which provides enough precision to prepare you to use game theory in some realistic applications but stopping short of the most technical books that may be appropriate for a more advanced course. At the most advanced level, I recommend Osborne and Rubinstein's A Course in Game Theory, Roger Myerson's Game Theory: Analysis of Conflict, or Fudenberg and Tirole's Game Theory, which are all fantastic but very technical. Osborne and Rubinstein's book has the added virtue of being available for free online.
I assume that students have a working knowledge of algebra, elementary calculus, and basic probability theory. Political Science 5052 or a comparable course is sufficient. For students who require a refresher on one or more of these topics, I recommend Simon and Blume's (1994) Mathematics for Economists or Moore and Siegel's (2013) A Mathematics Course for Political and Social Research.

GRADES AND REQUIREMENTS

The course grade will be determined as follows:

- Problem sets (approximately weekly): 50%
- Exams:
  - Exam 1: 25%
  - Exam 2: 25%

- The problem sets will help students to understand the core theoretical concepts and develop the ability to solve games.
  - I have not found a way to learn game theory that works as well as solving a lot of games, so the problem sets will be frequent and challenging.
  - Students may work together on problem sets but must each turn in separate assignments. Working together means discussing solutions and methods; it does not mean splitting up the problems or copying solutions from another students.
  - I strongly recommend that students typeset all problems in the LaTeX typesetting program: familiarizing yourself with a scientific typesetting system is a a research skill that will make it much easier for you to actually conduct game theoretic or otherwise mathematical research. I will put some helpful LaTeX help files on the course website.
- There will be two in-class exams, the timing of which will depend on how quickly we move through the material. The exams will be similar to the problem sets except that they must be completed in class without collaboration or reference materials.

Course Policies and Expectations

- Attendance is required.
- **Students must do the assigned reading and practice problem before you come to class.** We will try to use class time to solve practice problems together rather than re-introduce material from the books. Next to each week I will list the topic for the week, the required chapter from Osborne, and a recommended practice problem. The practice problem is not graded but is meant to be part of students' engagement with the required reading. We will typically begin class by reviewing the recommended practice problem so students should be prepared to explain their solutions if called upon. Your solutions to the practice problems may often be incorrect because I will not have explained the material yet. This is ~~fine~~ good. The point is to have attempted to grapple with the material before you walk into class.
- Academic Integrity. I take academic integrity very seriously. You may review the University's policies here.
- Late assignments. Late assignments may be accepted with a 10% deduction before graded assignments have been returned to students. After that time, late assignments will not be accepted.
- Accommodations due to disability. If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours.

Course Topics

A list of topics and associated course readings are below. Students must do the required reading and practice problem prior to the start of class on that day.

Date	Topic	Reading	Practice Problem
08/28	Individual decision-making	Morrow handout and Ch 1	6.1
09/04	Nash equilibrium (pure strategies)	Ch2	34.1
09/11	Pure Nash equilibrium (more examples)	Ch 3	75.1
09/18	Mixed strategy Nash Equilibrium	Ch 4 through 4.5	114.3
09/25	Mixed NE (more examples)	Rest of Ch 4	141.3
10/02	Extensive games	Ch 5	168.1
10/09	Extensive games (more examples)	Ch 6-7	196.2
10/16	No class. Fall break.	–	–
10/23	Exam	–	–
10/30	Bayesian games	Ch 9	284.1
11/06	Bayesian games (more examples)	Ch 9	307.1
11/13	Dynamic games of incomplete information	Ch 10 through 10.5	331.1
11/20	More dynamic games of incomplete info	rest of Ch 10	335.2
11/27	Repeated games	Ch 14-15	431.1
12/04	Bargaining	Ch 16	473.1