Course Description
This course is designed to provide a thorough introduction to non-cooperative game theory for political science/government PhD students. The objective of the course is to cover the basic concepts of non-cooperative game theory rigorously while allowing plenty of time to discuss applications in many different fields of political science. The course will not cover social choice theory or cooperative game theory.

Office Hours: Mondays, 1-3pm and by appointment. Office location is to be determined.

Please keep an eye on the blackboard site. I will post problem sets and solutions there.

Course Requirements
1. Homework assignments will be handed out roughly weekly – approximately 10 over the course of the semester – and will be due at the beginning of lecture one week from the date they are handed out. The material in a game theory course is cumulative, and it is extremely important not to fall behind. The homework assignments will not be graded. We will spend some time in each class reviewing the previous assignment. Solutions to the problem sets will also be made available.

2. Two tests: At two points during the semester (probably Oct 7 and Nov 4), there will be a take-home test in lieu of a problem set. For the take-home test, you may refer to textbooks but you must not collaborate with anyone else. Each test counts for 25% of the class grade.

3. An in-class final exam worth 50% of the class grade will take place, in the last day of classes, December 6.

Course Books
There are two required textbooks for the course, both of which I find to be excellent. It is highly recommended that you follow along in both of them as the course progresses:


There are of course many other game theory books that might be useful to you as references. Every author has a different style, and some styles work better for some students than others. Listed roughly in ascending order of difficulty:


The outline of the first half of the course roughly follows the order of material in both Osborne and M&M, although lectures will contain numerous political science examples that are in neither book. The second half of the course consists of advanced or special topics that are incompletely covered by any of the texts, or applications of the topics covered at the forefront of the current literature.

**Course Outline**

**Aug 28 and Sept 9: Normal Form Games of Complete Information I**
- Theory of Choice
- Introduction to Games in Normal Form (discrete strategy spaces)
- Dominance & Iterated Dominance
- Nash Equilibrium
- Mixed Strategies
- Normal form games with continuous strategy spaces
- Cournot, Hotelling party competition
- Osborne chapters 2 & 4; M&M Chapters 2, 4

**Sept 16 and Sept 23: Normal Form Games of Complete Information II**
- Existence of Nash Equilibrium
- Voter Theorem
- Spatial model of electoral competition
- Osborne Chapter 3; M&M Chapter 5

**Sept 30: Extensive Form Games of Complete Information I**
- Introduction to Games in Extensive Form (discrete strategy spaces)
- Subgame Perfect Equilibrium; backwards induction; “credible threats”
- Extensive form games with continuous strategy spaces
- Other examples from politics: Challenger entry and deterrence, Strategic Voting, Rubinstein bargaining.
- Osborne Chapters 5 & 6 & 7; M&M Chapter 7

**October 7: Extensive Form Games of Complete Information II**
- Extensive form games with continuous strategy spaces
- Other examples from politics: Ultimatum Game, Stackelberg, Agenda Control, Vote Buying
- Osborne Chapters 5 & 6 & 7; M&M Chapter 7
• TAKE HOME 1

October 21: Normal Form Games of Incomplete Information
• Bayesian Nash equilibrium
• Beliefs and Types
• Examples from politics: Swing Voter’s Curse, Cournot competition.
• Osborne Chapter 9; M&M Chapter 6

October 28: Extensive Form Games of Incomplete Information I
• Perfect Bayesian equilibrium
• Signalling Games: pooling and separating equilibria: Spence and Education
• Examples with discrete strategy spaces: Informational Lobbying
• Osborne Chapter 10; M&M Chapter 8

November 4: Extensive Form Games of Incomplete Information II
• Examples with continuous strategy spaces
• Osborne Chapter 10; M&M Chapter 8
• TAKE HOME 2

November 11: Extensive Form Games of Incomplete Information III
• Further examples, and refinements to Perfect Bayesian equilibrium
• Osborne Chapter 10, M&M Chapters 8

November 18: Repeated Games
• Finitely repeated games
• Infinitely repeated games
• Folk Theorem
• One-shot deviation principle
• Osborne Chapters 14 & 15; M&M Chapters 9, 10
• Bargaining Games

November 25: Topics

December 6: In-Class Final Exam