GOALS OF THE COURSE

This course is aimed at introducing game theory to graduate students in political science. Game theory is a mathematical methodology whose use has ballooned within political science in the past decade, and it is increasingly difficult to read the top journals in the discipline without some understanding of the technique. As with any methodology, the ability to use game theory well comes only after much practice and exposure, more than can be achieved in one semester. However, the course has two goals, both of which are aimed at providing a foundation for understanding journal articles and for going on to future training in game theory if you desire.

The first goal of the course is for students to understand some of the main types of strategic settings (games), and how to predict what strategies actors (players) will choose in those settings. In this course we will cover games of perfect information, which are games in which the players know all the relevant information about the strategic interaction in which they find themselves, including the other players’ preferences. This is obviously only one type of strategic setting. Next semester’s game theory course (in the spring of 2011) will cover games of imperfect information and other extensions.

The second goal of the course is for students to understand what game theory is, and what it is not. The methodology has been the source of contention in the discipline, and my opinion is that there is often more heat than light in this debate. Like any methodology, game theory has limitations, and like most, it can often be useful if employed properly. During the course, we will seek to understand both its uses and its limitations. (Nevertheless, as this is, after all, a course in game theory, we will be focused for most of the course on the technique’s uses.)

The course is divided into two sections, which roughly align with the two goals of the course. The first part of the course includes the first nine sessions, results in a final exam, and is designed to convey the basic tools for solving games of perfect information. The second part of the course is focused on some broad classes of problems about which the game theory learned in the first part of the class gives particularly useful insights. These include issues of credibility and commitment, and problems of collective action.
PRE-REQUISITES

There are no formal pre-requisites for this course, except high-school level math (algebra). However, game theory is a mathematical tool, and so the “informal” pre-requisite is an openness and willingness to employ mathematical techniques in the study of politics.

GRADING

Exercises related to the first goal of the course:

Problem sets: 40%

- There will be roughly one problem set per week in the first part of the class, and a lighter load in the second part of the class. These sets will be posted on the course’s Blackboard site (on Mondays or Tuesdays) and due at the beginning of the next class session. Late problem sets will not be accepted unless the circumstances are exceptional, and only with prior approval. Your lowest individual problem set grade will be dropped from the calculation of your final grade.

You may work in small groups to complete the sets, within a few guidelines. (1) You must attempt to solve all the problems before you meet in a group. (2) You must turn in your problem set individually, but you should include the names of other students with whom you consulted. (3) You should only turn in completed problems that you could, after having completed the assignment, answer again correctly. This is partly for your own benefit: if you do not understand the material, you will probably fail the final. If I am aware of this beforehand, I can try to help you.

Final exam: 40%

- The format will be announced beforehand.

Exercise related to the second goal of the course:

Final paper: 20%

- To understand how and why game theory can be useful, there is no substitute for actually trying to use the technique in the context of a problem that interests you. While next semester’s class will have you write a full-fledged paper, in this class you will be expected to lay out a problem that can be studied game-theoretically. This is harder than it sounds. We will discuss the requirements of the paper in class, but essentially I will want you to lay out a problem, explain briefly why it is interesting given the existing literature, and discuss what your approach would be to use game theory to shed light on it. The paper will be due on the last day of class.
CORNELL UNIVERSITY POLICIES AND REGULATIONS

Participation in this class commits students and instructors to abide by Cornell’s expectations and policies regarding equal opportunity and academic integrity. Further, it implies permission from students to submit their written work to services that check for plagiarism. Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. It is your responsibility to familiarize yourself with university policies regarding plagiarism and other violations of academic integrity. Violations of the University Code of Academic Integrity will be firmly dealt with in this class. The Code can be found on the web at:

http://cuinfo.cornell.edu/Academic/AIC.html

In addition, I will observe all university policies addressing racial, ethnic, gender, sexual preference, or religious discrimination and all forms of harassment; I will conduct class in conformance with the provisions of the Americans with Disabilities Act. Students are expected to familiarize themselves with pertinent policies and to bring any concerns related to them to my attention.

REQUIRED TEXTS

These books have been ordered in the bookstore, but you may find them cheaper online.


If you order online, make sure you order the correct edition number.

SCHEDULE OF CLASSES AND READINGS

This schedule is somewhat tentative, as much will depend on how quickly we are able to cover the necessary material in class. This is a cumulative subject, and the goal of the class is not to cover as much material as possible, but rather to make sure students understand well what we have covered. That said, this schedule has worked in the past, and I will do my best to stick to it.

In each session, there are readings from the textbooks as well as “applications” from journals, meant to show you how these techniques are used in practice. There will not be questions about these on either the problem sets or the final exam, and the priority is for you to read and understand the textbook material. However, you may find it useful to see how the techniques have been applied to problems related to political science.
Introduction

August 30: Introduction

Dixit et al., Chapter 1 (entire) and Chapter 2.1 (pp. 17-20)

Osborne, Chapter 1

R. Harrison Wagner’s “Who’s Afraid of ‘Rational Choice Theory’?”

September 13: The Basics of Strategic Games and Nash Equilibria

Dixit et al., Chapter 2.2-2.5 (pp. 20-41), Sections 4.1-4.2 (pp. 89-96), and Sections 5.2-5.3 (pp. 143-156)

Osborne, Sections 2.1-2.7 (pp. 13-35) and discussion of profiles in Section 17.4

Applications:


Solving Games with Simultaneous Moves

September 20: Solving Games with Discrete Strategies

Dixit et al., Sections 4.3-4.8 (pp. 97-120), Chapter 5.4a (pp. 157-159)

Osborne, Section 2.8 (pp. 35-39, not including example 39.1), 2.9-2.10 (pp. 45-54)

Applications:

- Same as September 7
September 27: Continuous Strategies Introduced

Dixit et al., Section 5.1 (pp. 133-142) and Chapter 5 Appendix (pp. 173-176)

Osborne, Section 2.8 (from Example 39.1 to page 45)

Application:


October 4: Continuous Strategies Continued: Oligopoly and Electoral Competition

Dixit et al., Section 5.4b (pp.159-162)

Osborne, Chapter 3.1-3.4

Application:


October 18: Mixed Strategies

Dixit et al., Chapters 7 and 8

Osborne, Chapter 4

Application:


Solving Games with Sequential Moves

October 25: Sequential Move Theory

Dixit et al., Chapters 3 (entire) and 6.2-6.4 (pp. 184-199)

Osborne, Chapter 5

Applications:


**November 1: Sequential Move Illustrations**

Osborne, Chapter 6

Application:


**November 8: Combining Simultaneous and Sequential Moves**

Dixit et al., Chapter 6.1 (pp. 177-184)

Osborne, Chapter 7

Applications:

  - This is also relevant to next week’s discussion.

  - The “top cycle set” discussed by Osborne in 7.4 was first defined in this article, though Ward called it the “majority set” (Osborne, p. 236).

**Topics**

**November 15: The Prisoner’s Dilemma, Repeated Games, and Collective Action**

Dixit et al., Chapters 11 and 12

Osborne, Chapters 14 and 15

Applications:


November 22: Credibility and Commitment

*Dixit et al., Chapter 10*

**Applications:**


November 29: Strategy and Voting

*Dixit et al., Chapter 16*

**Applications:**


**Final Exam**