POL 215: Introduction to Modeling Politics
Spring 2006
Tuesday 9:00am-11:50am
273 Social Sciences Building

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Course description
This course provides an introduction to formal modeling and social choice theory with an emphasis on game theory. Game theory is the mathematical study of interdependent decisions. Over the past two decades, game theory has been used increasingly for the analysis of phenomena in Political Science that cover all subfields of the discipline. Most work has been done in American Politics and International Relations, but the use of game theory in Comparative Politics is becoming increasingly common. Game theory has also had an impact on the Political Theory subfield as scholars reinterpret the classics in formal terms and seek to understand the foundations of game theoretic assumptions.

In its advanced form, game theory is characterized by a highly sophisticated and sometimes intimidating mathematical apparatus. It is not necessary to have a strong math background to take this course because we will discuss unfamiliar mathematical concepts and notation as the need arises. However, if you plan to take this course you should feel comfortable with algebra and you will need to learn/remember some basic calculus (we will discuss math and notation on the first day). Students with substantial training in math or computer programming are also welcome. Reading assignments have been kept to a minimum so you can spend time reading the text carefully and practicing your new skills on example problems.

Required texts
The texts we will use for this class are:
Osborne, Martin J. 2004. *An Introduction to Game Theory.* New York: Oxford

You may also find it useful to consult
Morrow, James. 1995. *Game Theory for Political Scientists*. Princeton: Princeton
Dixit, Avinash and Susan Skeath. 1999. *Games of Strategy*. New York: Norton

If you need a refresher on the math we encounter in this course, I recommend the text
Simon, Carl P. and Lawrence Blume. 1994. *Mathematics for Economists*. New York: Norton

The Osborne book should be available at the University book store, but it can be acquired online much more cheaply. (Try http://addall.com for a comparison of multiple new and used book stores).

Requirements
Your evaluation will depend on your understanding of basic formal theory and your ability to apply it to problems in political science. Your grade for this course will consist of three parts:

1. Participation
With the exception of our first course meeting, you should plan to do all of the readings prior to the class for which they are assigned. Failure to do this will make the seminar boring and useless for everyone. Well-prepared students will get full credit on the participation portion of their grade.

2. Weekly Assignments
Problem sets are the heart of this course. The only way you can learn formal theory is to practice it. You are encouraged to work with other people in the class on the weekly assigned problems (write the names of the people you work with at the top of your paper). Some of these problems have answers available on the web (http://www.chass.utoronto.ca/~osborne/igt/pub_sols.pdf)—please try to figure them out yourself before checking the solutions. Effort will be strongly rewarded—a thoughtful attempt to answer each problem on each assignment will guarantee you a reasonable grade, even if every single answer is wrong.

3. Final Presentation
The last two weeks of class will be devoted to final presentations. You will be expected to choose a paper published in the last 10 years with a formal model in it and present it as though it was your own work. You should be able to present the substantive justification, describe the model, solve for the equilibrium of the model, and present and explain propositions and implications of the model. You will have ten minutes. Each person will be randomly assigned a discussant who will then spend ten minutes probing the limitations of the model and asking the presenter questions about it. Your grade for the presentation will be based equally on both your roles as presenter and discussant.

Grades
You will be graded on each of the requirements and your final grade will be weighted as follows:
1. Participation in class (10%)
2. Weekly assignments (5% each x 8 assignments = 40%)
3. Final Presentation and Discussion (50%)

I will not give incompletes. Late assignments will be marked down the equivalent of a full letter grade for each 24 hour period they are late. To be clear, if you arrive immediately after class with an assignment that was due at the beginning of class, it will be marked down one letter grade. I will only make an exception to this policy if 1) you contact me a week in advance to discuss a conflict, or 2) you provide documentation of a severe illness or family emergency that prevented you from completing the assignment on time.

Tentative Schedule

April 4th Rationality and Decision Theory

Reading: Osborne, 1 (all), 17 (all)
Problem Set 1: 499.3, 504.2, 5.3, 6.1

April 18th Nash Equilibrium and Strategic Games

Reading: Osborne, 2 (all)
Problem Set 2: 27.1, 42.2, 48.1

April 25th Nash Equilibrium and Strategic Games, continued, and Dominance

Reading: Osborne, 3.3, 3.4, 12.2, 12.3, 12.4
Problem Set 3: 49.1, 74.1, 79.2, 80.2

May 2nd Mixed Strategies

Reading: Osborne, Chapter 4 (all)
Problem Set 4: 114.2, (118.2 or 118.3), 141.2(b)

May 9th Sequential Games

Reading: Osborne, 5 (all), 6.1, 6.3, 6.4, 7.1, 7.3, 7.4, 7.6, 7.7
Problem Set 5: 156.2, 173.2, 183.3, 196.3, 221.1, 247.1

May 16th Coalitional Games, Arrow's Impossibility Theorem, and Bargaining

Reading: Osborne 16.1, 8.1, 8.2, 8.3, 8.6, 8.8
Geanakoplos, John, "Three Brief Proofs of Arrow's Impossibility Theorem". (available at http://cowles.econ.yale.edu/P/cd/d11a/d1123-r3.pdf)
Problem Set 6: 473.1, 247.1, 262.1

May 23rd Imperfect Information and Bargaining

Reading: Osborne, 9.1, 9.2, 9.3, 9.5, 9.7, 10 (all)
Problem Set 7: 282.1, 306.1, 307.1

May 30th Repeated Games

Reading: Osborne, 14 (all), 15 (all)
Problem Set 8: 431.1, 433.1

June 6th, 13th Presentations