PS 2703: Formal Political Theory

Fall 2007

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Class Meetings
Mondays 12:00-1:25 PM and Wednesdays, 10:00-11:25 AM
4500 W.W. Posvar Hall

Office Hours
To be determined and by appointment

Formal political theory involves constructing and analyzing mathematical models to gain insights about social and political phenomena. The advantages of mathematical modeling are that it forces analysts to identify key features of the situations under investigation and it ensures that claims and predictions follow logically from the premises of a model. Mathematics provides the basic language, notation, and tools for such analysis, and game theory provides a standard framework for representing and analyzing strategic interaction (i.e. models of multi-person decision-making in which outcomes depend on the interdependent decisions of two or more people). Regardless of whether or not students intend to develop formal models in their work, knowledge of game theoretic ideas and analysis is essential for new political scientists in every subfield.

This is the first of a two course sequence in formal theory for doctoral students in political science. It introduces the basic concepts and techniques for analyzing game theoretic models. Although examples and applications will draw mainly from political science, the emphasis of this course is on developing *methodological skills* rather than substantive knowledge. Specifically, the goals of the course are to:

- Analyze basic classes of games and apply solution concepts.
- Gain familiarity with several well-known applications.
- Prepare for the second course, which covers substantive applications in greater detail.
- Enhance your ability to think logically and rigorously.

EXPECTATIONS

The course has no formal mathematical prerequisites and emphasizes *precision* and *logical rigor* over technical sophistication. That means that I only assume that students are familiar with algebraic computations (manipulating expressions and solving equations), have had exposure to calculus and probability, but have little or no experience writing proofs.

Learning formal analysis is not easy. It requires dedication and a lot of practice, and I expect that you will devote the time and effort necessary to do so.

To assist you in your efforts learning formal analysis, I will assign many problem sets. I strongly recommend that you heed the following advice:

- Start problem sets as soon as they are assigned and do all of the problems. Do not wait until the day before they are due to start them.
- Work through examples and do additional exercises in the text.
- Do as much as possible *on your own*, and only work with others when you are stuck or to check your answers. The only way to learn theory is by practicing, thinking, and oftentimes, struggling. You will not develop analytical skills by passively listening to someone else explain answers to you.
- Keep up with the pace of the course and catch up quickly if you fall behind. Much, if not all, of the course content is cumulative, so you will be at a serious disadvantage if you fail to keep up.

REQUIREMENTS

- Problem Sets 30%
- Midterm Exam 20%
- Final Exam 50%

Problem sets are assigned and due on Mondays. In addition to the problem sets, I will assign short warm-up problems on Mondays that you should work on before Wednesday's class. There will be one midterm (24-hour take home exam) and a final exam.

COURSE MATERIALS

Readings and problems will be assigned from two texts:

Martin Osborne, *An Introduction to Game Theory* (2004, Oxford Univ. Press)
Nolan McCarty and Adam Meirowitz, *Political Game Theory: An Introduction* (2007, Cambridge Univ. Press)

Other game theory books that might be helpful for their alternative expositions are:

Avinash Dixit and Barry Nalebuff, *Thinking Strategically* (informal)
David Kreps, *Game Theory and Economic Modelling* (somewhat informal)
James Morrow, *Game Theory for Political Scientists*
Robert Gibbons, *Game Theory for Applied Economists*
Peter Ordeshook, *Game Theory and Political Theory*

Two higher-level, abstract, technical treatments can be found in:

Martin Osborne and Ariel Rubinstein, *A Course in Game Theory*
Drew Fudenberg and Jean Tirole, *Game Theory*

Standard graduate microeconomic theory textbooks also contain several chapters on game theory that may be helpful for alternative expositions:

David Kreps, *A Course in Microeconomic Theory*
Andreu Mas-Colell, Michael Whinston, and Jerry Green, *Microeconomic Theory*

COURSE OUTLINE

Lectures will be drawn primarily on readings marked with an asterisk (*).

1. Logic and Proofs (Aug 27)

McCarty and Meirowitz: Chapter 12 (math appendix), Secs 1-2
Osborne: Chapter 17 (math appendix), Secs 1-3

2. Rationality and Individual Choice (Aug 29)

* McCarty and Meirowitz: Chapter 2, Secs 1, 3, and 5
Osborne: Chapter 1

3. Social Choice (Sep 3-5)

* McCarty and Meirowitz: Chapter 4, Secs 1-3

4. Normal Form Games (Sep 12-26)

* Osborne: Chapter 2
McCarty and Meirowitz: Chapter 5

5. Choice Under Uncertainty (Oct 1)

* Osborne: Chapter 4, Secs 1 and 12
McCarty and Meirowitz: Chapter 3, Secs 1-2

6. Mixed Strategies (Oct 3)

* Osborne: Chapter 4, Secs 2-4

7. Bayesian Games (Oct 8-10)

* Osborne: Chapter 9, Secs 1-3, 5, 7
McCarty and Meirowitz: Chapter 6, Secs 1-3, 5

**** Take-Home Midterm Exam (Oct 12-13) ****

8. Extensive Form Games (Oct 15-29)

* McCarty and Meirowitz: Chapter 7, Secs 1-6
Osborne: Chapter 5
* Osborne: Chapter 6, Sec 1; Chapter 7, Sec 4

9. Dynamic Games of Incomplete Information (Oct 31-Nov 5)

* McCarty and Meirowitz: Chapter 8, Sec 1
* Osborne: Chapter 10, Secs 1-4

10. Signaling (Nov 7-12)

* McCarty and Meirowitz: Chapter 8, Secs 2-3
* Osborne: Chapter 10, Sec 5

11. Bargaining (Nov 14-19)

* McCarty and Meirowitz: Chapter 10, Secs1-4
Osborne: Chapter 16

12. Repeated Games (Nov 26-28)

* McCarty and Meirowitz: Chapter 9, Secs 1-6
Osborne: Chapter 14

13. Computational Modeling (Dec 3)

* Kollman, Miller, and Page, "Adaptive Parties in Spatial Elections" *APSR* (1992)
* Bendor, Diermeier, and Ting, "A Behavioral Model of Turnout" *APSR* (2003)

14. Theory Meets Data: EITM and Experiments (Dec 5)

Krehbiel, Meirowitz, and Woon, "Testing Theories of Lawmaking" (2005)
http://www.pitt.edu/~woon/papers/kmw_ttol.pdf
Chiou and Rothenberg, "When Pivotal Politics Meets Partisan Politics"*AJPS* (2003)
Eavey and Miller, "Fairness in Majority Rule Games with a Core" *AJPS* (1984)
Frechette, Kagel, and Lehrer, "Bargaining in Legislatures: An Experimental Investigation" *APSR* (2003)