Winter 2019
PLSC 30901
Game Theory I

Professor Nalepa
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The University of Chicago
T, Th: 2:00-3:30
Pick 506

Office hours: Tuesdays 3:30 -5pm
Pick 324A
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TA Office Hours: Tuesdays, 10:30-11:30am; Thursdays, 5:30-6:30pm
Pick 507

Course description

This course is an introduction to game theory. It serves as a prerequisite (covering game of complete information) to Game Theory II (covering game of incomplete information) offered in the Autumn Quarter of next year. The origins of game theory reach back to the beginning of the 20^{th} century when John von Neumann paired up with Oscar von Morgenstern to write the "Theory of Games and Economic Behavior." For von Neumann, game theory was a side project from his main occupation–in 1943 he was consulting on the Manhattan Project to develop the atomic bomb, and from 1944 he worked on designing the first electronic computer. Yet, their joint contribution started a rich research program culminating in the work of John F. Nash, Jr. who initiated the game theoretic study of bargaining. Nash received the Nobel Prize in 1994, along with two other game theorists, John C. Harsanyi and Reinhard Selten. Since then, many other game theorists have been recognized by the Swedish Academy, including, Roger Myerson, Robert Aumann, Amartya Sen, Eleanor Ostrom, and most recently, Jean Tirole.

The course will be centered around several applications of game theory to politics: electoral competition, agenda control, lobbying, signaling in legislatures and coalition games.

Required and Recommended Materials

The textbook for this class is **Martin J. Osborne "An Introduction to Game Theory" Oxford University Press 2004** [Osborne].

We will cover chapters 1, 2, 3, 4, 5, 6, and 7 and the mathematical appendix (for mathematical prerequisites see below).

Although the class material will be presented according to the notation from Osborne's textbook, there is no one perfect game theory textbook. You are welcome to consult the following introductory books and re-read the chapters corresponding to the material we covered in class. You may find a different textbook to be a better fit for your needs.

1. Barron, Emmanual N. Game Theory: An Introduction. John Wiley and Sons, 2013.
2. Gehlbach, Scott. Formal Models of Domestic Politics. Cambridge University Press, 2013.
3. Kuhn, Harold William. Classics in Game Theory. Princeton University press, 1997.
4. McCarty, Nolan, and Adam Meirowitz. Political Game Theory: An Introduction. Cambridge University Press, 2007.
5. Morrow, James D. Game Theory for Political Scientists. Princeton University Press Princeton, NJ, 1994.
6. Myerson, Roger B. Game Theory. Harvard University press, 2013.
7. Ordeshook, Peter C. Game Theory and Political Theory: An Introduction. Cambridge University Press, 1986.
8. Tadelis, Steven. Game Theory: An Introduction. Princeton University Press, 2013.

Mathematical prerequisites

The mathematical prerequisites for this course are rather modest. I expect you to know basic set theoretic operations, algebraic operations, fundamentals of calculus, and some formal logic, most of which are covered in the mathematical appendix of Osborne and in the handout distributed in class on the first day. However, for those of you who would like more background material, the most comprehensive presentation I can recommend is:

Pemberton, Malcolm, and Nicholas Rau. Mathematics for economists: an introductory textbook. Oxford University Press, 2015.

Exams

There will be no exams in this class. What makes a good modeler is not the speed with which he or she solves a game but the insights that can be gleaned from his or her model. The absence of any exams does not mean that you are not expected to work hard.

Grading

Grades will be assigned according to the following rubric:

A	81-100%
B	61-80%
C	41-60%
D	26-40%
F	0-25%

Pluses and minuses will be awarded at the discretion of course staff.

There will be 8 substantial problem sets. 7 of them with be worth 10% each and the final one will be worth 30%

Problem Sets

Every Thursday, following the substantive lecture, you will be handed a short problem set. You must come to class or to office hours following class to receive the assignment. I will not distribute assignments electronically. The first 7 assignments may be done in groups of 2 or 3 students. Each group will produce one PRINTED and TYPED submission. Handwritten assignments or assignments in electronic format (e-mail) will not be accepted. The final assignment must be completed individually, without the help of your group. No late assignments will be accepted, as the assignments will be solved in class or office hours after they are due.

The purpose of the written homework in this course is to develop your skills in understanding and communicating game theory. It is not to give you busy work or drill. Don't think of your homework as a certificate proving that you have done the assignment. Think of it as an exercise in learning and in reporting what you have learned. There is a lot of truth in the statement "*if you can't explain it, you don't understand it.*" Communicate with the reader. Don't write to the instructor (who already knows how to do the problems), but explain your solutions to someone who needs help, perhaps a classmate who has been absent. Start at the beginning, and be clear, logical and complete.

The purpose of group work is two-fold. First, by sharing ideas you will be able to learn from each other, allowing you to clarify what you have learned from the lectures and readings. Second you will become accustomed to working with other people. Few occupations call for working in isolation. The goal for group assignments is for each group member to understand the entire assignment. Frequently a major part of an assignment will be to summarize the various components of the problem at hand. To do this, you will need to understand the entire assignment. Therefore you should not divide the problems among your group members: each person should work on every part and you should collaborate and discuss your results.

Problem sets will be due the Tuesday immediately following the Thursday they were handed out. No late homeworks will be accepted, as we will solve the problems in Thursday's session together.

Socratic method

In class, I will frequently engage in what is known in some law schools as the "Socratic method", that is, I will call on students without prior warning to answer questions related to the readings or lectures. Therefore, it is in your interest to come prepared for each class.

Piazza

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com. Find our class page at: https://piazza.com/uchicago/winter2019/plsc30901/home

One way to earn extra credit in the course is to answer a question posted by a class mate. This extra credit will contribute to the plus and minus portion of your grade and will be at the discretion of the teaching staff.

Laptop Policy

In the class I will be following a no laptop policy. If you wish to take notes on the handouts, you must print them before coming to class. Recent research shows that having laptops open in the classroom is detrimental to the learning process. You can read more about this research here: https://www-ncbi-nlm-nih-gov.proxy.uchicago.edu/pubmed/28182528

Calendar

January 8: Introduction to formal modeling

Satz, Debra and John Ferejohn. "Rational Choice and Social Theory." The Journal of Philosophy 91.2 (1994): 71-87.

Myerson, Roger B. Learning from Schelling?s Strategy of Conflict. Journal of Economic Literature, 2009, 1109-25.

O'Neill, Barry. "Weak Models, Nil Hypotheses, and Decorative Statistics: Is There Really No Hope?." Journal of Conflict Resolution 39.4 (1995): 731-748.

Recommended: Clarke, Kevin A., and David M. Primo. A Model Discipline: Political Science and the Logic of Representations. Oxford University Press, 2012.

January 10: Introduction to formal modeling

Osborne, 1-9, Mathematical Appendix: 493-500 (sections 17.1-17.4)

January 15: Strategic games and examples

Osborne, 13-21 (up to section 2.6)

January 17: Nash Equilibrium and best response functions

Osborne, 21-31 and 35-41

January 22: Public Goods Experiment with Ji Xue

January 24th: Special Calculus session with Genevieve Bates

January 29: Voter participation and contributing to a public good—theory

Osborne, 42-45

January 31: Dominated actions and weak dominance

Osborne, 45-48

February 5: Collective decision-making

Osborne, 49-50

McCubbins-Cox, "Setting the Agenda," Chapter 3

February 7: Electoral competition

Osborne, 70-76

February 12: Hotelling models

Downs, "An Economic Theory of Democracy," Chapter 8

Recommended: Shepsle, K. A. (1991). Models of Multiparty Electoral Competition. Chur; New York, Harwood Academic Publishers.

Februaury 14: Models of Lobbying (Auctions)

Osborne, 80-90

Recommended:

1. Snyder, J.M., & Ting, M. (2005). "Why Roll Call? A Model of Position-taking in Legislative Voting and Elections. Journal of Law, Economics, and Organization, 21(1), 153–178.

2. Fox, Justin (2007) "Government Transparency and Policymaking," Public Choice, 131 (1-2) 23-44

February 19: Probability, randomization, mixed strategy equilibrium

Osborne's mathematical appendix, 17.6.1-17.6.4, 99-123,

February 21: Applications of mixed strategy equilibria: Comparative Statics

Osborne 134-137 (up to section 4.10)

February 26: Games in extensive form. Backward induction

Osborne, 154-173

Recommended:

1. Osborne, 225-236
2. Selten, Reinhard (1978). "The chain store paradox." Theory and Decision 9 (2): 127–159

February 28: Vote buying

Osborne, 192-196

March 5: Models of agenda setting. Relationship between SPE and NE

Osborne, 186-187, 215-221

Recommended:

1. Romer, T. and H. Rosenthal (1978). "Political Resource Allocation, Controlled Agendas, and the Status Quo." Public Choice 33: 27-44.
2. Farquharson, R. (1969). "Theory of Voting." Oxford, Blackwell, Oxford University, 1958: xii, 83 p.
3. Miller, Nicholas R. "A New Solution Set for Tournaments and Majority Voting," American Journal of Political Science, 24(1), 68-96
4. McKelvey, R. and R. Niemi (1978) "A multistage game representation of sophisticated voting for binary procedures." Journal of Economic Theory,18, 1-22

March 7: Models of Delegation

Gehlbach, Scott. Formal Models of Domestic Politics. Cambridge University Press, 2013. (Chapter on delegation)

Huber, John D., and Charles R. Shipan. Deliberate discretion?: The institutional foundations of bureaucratic autonomy. Cambridge University Press, 2002. (Chapter with delegation model with discretion limits)

Nalepa, Lustration, Purges and Truth Commissions: The Long Term Consequences of Dealing with Authoritarian Legacies (Chapter 3)

March 12: Review before Final Problem Set

Other recommended readings
Bureaucracy, delegation, expertise, oversight

1. Huber, John and Nolan McCarthy 2004. "Bureaucratic Capacity, Delegation and Political Reform,"APSR 98(3), 481-494

2. Gailmard, Sean and John W. Patty. 2007. "Slackers and Zealots: Civil Service, Policy Discretion and Bureaucratic expertise", AJPS 51(4) 873-889

3. Bendor, Jonathan and Adam Meirowitz. 2004. Spatial Models of Delegation APSR 98(2):293-310.

4. Ting, M. M. (2003). "A Strategic Theory of Bureaucratic Redundancy." American Journal of Political Science 47(2): 274-292.

5. Bawn, K. (1997). "Choosing Strategies to Control the Bureaucracy: Statutory Constraints, Oversight, and the Committee System." Journal of Law, Economics, & Organization 13(1): 101-126.

6. Gailmard, Sean. 2009. "Multiple Principals and Oversight of Bureaucratic Policymaking." Journal of Theoretical Politics 21(2): 161-186

7. Gailmard, Sean. 2009. "Discretion Rather than Rules: Choice of Instruments to Control Bureaucratic Policy Making." Political Analysis 17(1): 25-44

8. Gailmard, S. (2002). "Expertise, Subversion, and Bureaucratic Discretion." J Law Econ Organ 18(2): 536-555.

9. McCarty, N. (2004). "The Appointments Dilemma." American Journal of Political Science 48(3): 413-428.

10. Figueiredo, R. J. P. d., Jr. (2002). "Electoral Competition, Political Uncertainty, and Policy Insulation." The American Political Science Review 96(2): 321-333.

11. Huber, John D. and Nolan McCarty. 2006. "Bureaucratic Capacity and Legislative Performance" in Macropolitics of Congress, E. Scott Adler and John Lapinski, eds. Princeton: Princeton University Press.

12. Ferejohn, J. and C. Shipan (1990). "Congressional Influence on Bureaucracy." Journal of Law, Economics, & Organization 6: 1-20.

13. Hopenhayn, H. and S. Lohmann (1996). "Fire-Alarm Signals and the Political Oversight of Regulatory Agencies." Journal of Law, Economics, & Organization 12(1): 196-213.

Principal-agent models

1. Sappington, D. E. M. (1991). "Incentives in Principal-Agent Relationships." The Journal of Economic Perspectives 5(2): 45-66.

2. Maskin, E. and J. Tirole (1992). "The Principal-Agent Relationship with an Informed Principal, II: Common Values." Econometrica 60(1): 1-42.

Fair Division

1. Brams, S. J. and D. M. Kilgour (2001). "Competitive Fair Division." The Journal of Political Economy 109(2): 418-443.

2. Aumann, R. and M. Maschler (1985). "Game Theoretic Analysis of a Bankruptcy Problem from the Talmud." Journal of Economic Theory 36: 195-213.

3. Elster, J. (1992). Local Justice. How Institutions Allocate Scarce Goods and Necessary Burdens. New York, Russel Sage Foundation.

4. Kaminski, M., M. (2000). "Hydraulic Rationing." Mathematical Social Sciences.

5. O'Neil, B. (1982). "A Problem of Rights Arbitration from the Talmud." Mathematical Social Sciences 2: 345-371.

6. Young, P. (1987). "On Dividing an Amount according to Individual claims and Liabilities." Mathematics of Operations Research 12(No. 3 August 1987): 398 -414.

7. Young, P. (1994). "Equity in Theory and Practice." Princeton, Princeton University Press: 190 - 199 (Claims and Liabilities).

8. Young, P. (1994). "Equity in Theory and Practice." Princeton, Princeton University Press: 65-80 (Equity, Equality and Proportionality).

Legislative-Executive relations

1. Epstein, D. and S. O'Halloran (1996). "Divided Government and the Design of Administrative Procedures: A Formal Model and Empirical Test." The Journal of Politics 58(2): 373-397.

2. Huber, J. D. (1996). "The Vote of Confidence in Parliamentary Democracies." The American Political Science Review 90(2): 269-282.

3. Bernhardt, Dan, John Duggan and Francesco Squintani (2009). American Political Science Review 103 (4): 570-587

4. Ting, Michael M., (2009)"Legislatures, Bureaucracies and Distributive Spending" . APSA 2009 Toronto Meeting Paper. Available at SSRN: http://ssrn.com/abstract=1449846