POLITICAL SCIENCE W4209: GAME THEORY AND POLITICAL THEORY (SPRING 2011)

Professor:	Macartan Humphreys	**Time**:	MW 9:10am-10:25am
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Overview

W4209 provides a high-level introduction to game theory. We focus on basic concepts and major results of importance for political scientists. It is appropriate for graduate and advanced undergraduate students. Major results from social choice and game theory are covered with applications in the study of collective action, voting, and bargaining. I will assume that students are comfortable with mathematical techniques at the level of Political Science W4360 (Math Methods for Political Science) or intermediate microeconomics.

Requirements

The requirements are:

- 35% A **midterm and a final exam** accounting for 15% and 20% of your grade respectively.
- 30% There will be six **sets of problems** and exercises to complete throughout the course; these are intended to evaluate your understanding of the material and to allow for deeper exploration of models studied, and, especially, to practice model construction and proof writing. These each account for 5% of the course grade. Dates in which they are handed out and are due are marked with a ❍ and a ● in the topics table respectively. Late problem sets will not be accepted.
- 25% You will be required to write **a short original paper** or **group project** presenting a model, a theorem or simulation. This paper is your key original output from this course. It can be short (10 pages) but should typically motivate a problem, develop a model, prove or demonstrate ensuing propositions, and identify testable predictions. You may be asked to present parts of your model in class or in the case of games and simulations you may gain a slot in the final day of class to "run" your model if applicable . The paper is due on midnight **7 May 2010**.
- 10% You will be required to participate in **weekly sections** where problem sets will be reviewed, and class and research material will be discussed.

Resources

- Required Readings are marked with **R:** on the topics table. These area all examinable.
- You should learn some R: http://www.r-project.org/ http://cran.r-project.org/doc/manuals/R-intro.pdf We will make some code available for running simulations of various games.
- It would be good if you also learned LATEX http://www.latex-project.org/ for writing up exercises
- The main coursebook is Martin Osborne's An Introduction to Game Theory which is on order at Book Culture (Labyrinth)
- Other required readings will be available on courseworks
- Send queries and clarifications to your TA who will in most cases respond "publicly"

Topics Table I

	Class	Topics and results	Readings
Social Choice	W 19 Jan	**1 Rationality and Social Choice** The Condorcet Paradox	**R:** Shepsle K. <u>Analyzing Politics</u>. Ch 3 & 4 Ordeshook, P., 1995. Game Theory and Political Theory: An Introduction:CUP: 53-55. Kreps, D.,1988, <u>Notes on the Theory of Choice,</u> Westview Press Ch 2-4. Varian: "How to Build an Economic Model in Your Spare Time" Halmos: http://www.mat.uc.pt/~pedro/lectivos/LaTeX/how-to-write-mathematics.pdf
	M 24 Jan	**2 The Problem of Social Choice** Arrow's Theorem Paretian Liberals	**R:** Ordeshook, P., 1995. Game Theory and Political Theory: An Introduction: CUP, 56-65. **R:** Handout Sen, A. (1964)"Preferences, Votes and the Transitivity of Majority Decisions," <u>Rev Ec Stud</u> 31: 163-165. Geanakoplos, Jn, 2001. <u>Three Brief Proofs of Arrow's Impossibility Theorem</u> Sen, A. 1970. "<u>The Impossibility of a Paretian Liberal</u>." <u>JPE</u> 78:1, pp. 152-57.
	W 26 Jan ○1	**3 Majority Voting** The Median Voter Theorem, May's Theorem	**R:** Ordeshook, P., 1995. Game Theory and Political Theory: An Introduction: CUP: 65-82 **R:** Dasgupta P. and E. Maskin, 2004, "The Fairest Vote of All", <u>Scientific American</u>, March: 92-97. Black, D. (1948) "On the Rationale of Group Decision-Making," <u>Journal of PoliticalEconomy</u> 56: 23-34. May, K. 1952. 'A Set of Independent Necessary and Sufficient Conditions for Simple Majority Decision,' <u>Econometrica</u>, 20: 680-4.
	M 31 Jan	**4 Chaos and Responses** Plott's Theorem	**R:** Shepsle K. <u>Analyzing Politics</u>. Ch 5 & 6 Plott, C R. 1967. A Notion of Equilibrium and Its Possibility Under Majority Rule. <u>AER</u>, 57: 787-806. McKelvey, R. 1976. "Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control." <u>JET</u> 12: 472. Myerson,R. 1992. "Incentives to Cultivate Favored Minorities Under Alternative Electoral Systems" APSR 87: 856.
Normal Form Games	W 2 Feb ●1	**5 Intro to Normal Form Games** The Tragedy of the Commons	**R:** Osborne 2 Olson, M. <u>The Logic of Collective Action</u>, CUP. 1971. 5-66
	M 7 Feb	**6 Solving Normal Form Games**	**R:** Osborne 3
	W 9 Feb ○2	**7 Nash I**	**R:** Osborne 2 & 3 again McCarty N., and A. Meirowitz.2007. <u>Political Game Theory</u>. CUP, Ch. 5.1-5.5. Nash, J. 1953. 'Two-person Cooperative Games', <u>Econometrica</u> 21: 128–140. Krishna, V. 2002. <u>Auction Theory,</u> Academic Press: 16-20 McCarty and Meirowitz – Game Theory and Political Theory Ch 5.1-5.5
	M14 Feb	**8 Risk** The Expected Utility Theorem	**R:** Osborne 4 Kreps, D.,1988, <u>Notes on the Theory of Choice,</u> Westview Press. Ch. 4-6. Pratt, J.W. 1964. "Risk Aversion in the Small and in the Large", <u>Econometrica</u>, 32: 122-36. McCarty N., and A. Meirowitz.2007. <u>Political Game Theory</u>. CUP, Ch 3.1-3.2 Von Neumann and Morgenstern, <u>Theory of Games and Economic Behavior</u>, Ch 3.
	W16 Feb ●2	**9 Mixed strategies I** Minimax theorem,	**R:** Osborne, Chs 4 Kahneman, D. and A. Tversky. 1979. 'Prospect Theory: An Analysis of Decision under Risk' <u>Econometrica</u> 47: 263-292. McCarty N., and A. Meirowitz.2007. <u>Political Game Theory</u>. CUP, Ch 3.4
	M 21 Feb	**10 Mixed strategies II** Harsanyi Purification, Nash	**R:** Srihari, Reny,& Robson. A short proof of Harsanyi's purification theorem. GEB 2003. Besley T. and S. Coate. 1997. 'An Economic Model of Representative Democracy' <u>QJE</u> 112: 85-114 Gale, D. 1979. "The Game of Hex and Brouwer Fixed-Point Theorem". <u>AMM</u> 86: 818–827.
	W23 Feb ○3	**11 Other solution concepts** Shapley values, Correlated/ Strong/CP Equilibrium	**R:** Osborne Ch 12

	Class	Topics and results	Readings
Extensive Form Games	M 28 Feb	**12 Extensive Form Games** Kuhn's Theorem, Zermelo's Theorem	**R:** Osborne, Chs 5, 6 McCarty N., and A. Meirowitz.2007. Political Game Theory. CUP, Ch 7.1. Schwalbe, Ulrich and Walker, P. 2001. 'Zermelo and the Early History of Game Theory,' GEB 34: 123–137. Kuhn, H.W. 1953. 'Extensive games and the problem of information', In Kuhn (ed.). 1997. Classics in Game theory. PUP.
	W 2 Mar ●3	**13 Subgame Perfection**	**Req.** Deane,S. 1995. 'Maths Class,' The New Yorker, June 26: 100 McCarty N., and A. Meirowitz.2007. Political Game Theory. CUP, Ch 7.3
	M 7 Ma	**14 Review**	
	W 9 Mar	15 In class exam	
	M 20 Mar	**16 Agenda Setting** The Setter Problem	**R:** Osborne Ch 7 Romer and Rosenthal, "Political Resource Allocation, Controlled Agendas, and the Status Quo." (PC 33: 27/CR)
	W 23 Mar ○4	**17 Applications to Bargaining** Stahl-Rubinstein bargaining; Bargaining in Legislators	**R:** Osborne Ch 16.1 **R:** Baron D and J Ferejohn. 1989. "Bargaining in Legislatures." APSR 83: 1181-1206.
I Incomplete information	M 28 Mar	**20 Incomplete information I** Bayes' Rule; The Harsanyi Representation	**R:** Osborne Ch 9 Harsanyi, J. C. 'Games with Incomplete Information Played by 'Bayesian' Players. In Kuhn 1997. Classics in Game theory. PUP. McCarty N., and A. Meirowitz.2007. Political Game Theory. CUP – Ch 8.
	W 30 Mar ●4	**21 Incomplete information II** Perfect Bayesian Equilibrium	**R:** Osborne Ch 10 Fearon, J.D. 1995. "Rationalist explanations for war," International Organization,49: 379-414. Baliga, S. and T. Sjostrom. (2004): "Arms Races and Negotiations," Rev Ec Stud 71(2): 351-69. Gilligan and Krehbiel, "Collective Decisionmaking and Standing Committees: " (JLEO 3: 287/CR)
	M 4 Ap	**22 Incentive compatibility, Accountability and Bargaining** Revelation Principle,Gibbard- Satterthwaite, Myerson- Satterthwaite Theorem	**R:** Osborne Ch 5.1 McCarty N., and A. Meirowitz.2007. Political Game Theory. CUP – Ch 10. Caselli,F. and M. Morelli. 2004. 'Bad Politicians'. Journal of Public Economics, 88: 759-782. Myerson & Satterthwaite, 1983. Efficient mechanisms for bilateral trading JET 28. Gibbard,A. 1973. 'Manipulation of voting schemes: a general result', Econometrica 41: 587–601
	W 6 Apr	**23 Auctions** Revenue Equivalence Theorem	**R:** P Klemperer. 2000. Auction Theory: A Guide to the Literature Krishna, V. 2002. Auction Theory, Academic Press: 29-24.
	M 11 Apr ○5	**24 Common Knowledge** Aumann's Agreement Theorem	**R:** Geanakoplos, J Common Knowledge 1992. Journal of Economic Perspectives 6(4) Aumann, R.J. 1976. "Agreeing to Disagree". The Annals of Statistics **4** (6): 1236–1239
	W 13 Apr	**18 Repeated Games I** The Discounted Utility model; The Folk Theorems	**R:** Osborne, Ch. 14, 15 McCarty N., and A. Meirowitz.2007. Political Game Theory. CUP, Ch. 9.1-9.5.
	M 18 Apr ●5	**19 Repeated Games II (Andy)** Cooperation and Groups	**R:** Fearon J, and D Laitin. 1996. "Explaining Interethnic Cooperation," APSR, 90:715-735. Axelrod, R. 2006., The Evolution of Cooperation, Cambridge 2006. Ch 2&4. Benabou, R.1997. "**Inequality and Growth**," NBER Working Papers 5658
Evolution	W 20 Apr	**25 Evolution I** Evolutionarily Stable Equilibrium	**R:** Osborne Ch 13 Dawkins, Richard. The Selfish Gene
	M 22 Apr ○6	**26 Evolution II** The Bishop–Cannings theorem	**R:** Brian Skyrms, 1996. Evolution of the Social Contract. CUP. Aviad Heifetz, Chris Shannon, Yossi Spiegel, What to maximize if you must, JET, 133(1) 2007, 31-57
End	W 27 Apr ●6	27 Review	
	M 2 May	28 Class Presentations	