GVPT 832 - Spring 2008
Game Theory

NOTE: This course is listed with an old title and an old description. Neither has much to do with this class.

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Game theory is a general theory of behavior. It has long been used by all social sciences but the impact of the last two decades, in political science in particular, has been extraordinary. This course provides an introductory outline of game theory. It is meant to be accessible to all graduate students and accommodate a variety of needs and substantive interests. Whether you want to become an informed reader of modern social science or use the tools of game theory in your own research, you should find this course equally useful. My plan is to give you a reasonably comprehensive overview of modern game. Our list of topics will roughly correspond to the one in Watson's book (see below), minus his chapters on specific applications to economics, plus evolutionary games and introductory topics. This class has no prerequisites.

Grading will be based on your comprehension of the basic material. (While some may choose to proceed at a more advanced level, all will be graded on the comprehension of the "lowest common denominator" level.) It will be established through weekly problem sets and follow up meetings I will have with each of you to discuss your solutions. The routine will work as follows: Each week, or so, you will be turning in solutions to a set of problems. After the due date I will be posting solutions on the web. You will then compare my solutions with your work and see which parts of the material you did not or still do not understand. We will then meet to talk about this material and go over any points that you are still uncertain about. That way I will make sure that you get the basics, you will make sure that you get the basics and that I know that you got the basics, and so the grading should turn into a pure formality.

Some of you may want to work with a more mathematical (formalized) material, others may choose to work at a less technical level. There are some very good textbooks that operate at different levels of formalization. Avinash Dixit and Susan Skeath's "Games of Strategy" is aimed at a very diverse, in terms of background and tolerance of mathematical material, undergraduate audience and tries to avoid almost all mathematics. It is a great source of initial, informal explanation of basic concepts and ideas. Joel Watson's "Strategy" is one step above Dixit and Skeath. Watson is rigorous, in terms of notation and definitions but still does not use almost any mathematics. Next comes Martin Osborne and Ariel Rubinstein "A Course in Game Theory" and Drew Fudenberg and Jean Tirole "Game Theory." Both books operate at a more advanced level and are considerably more difficult to read. Dixit and Skeath with Watson's formalization will be our lowest common denominator. To study on your own you should pick a book that is challenging but not intimidating. Feel free to work with any book from the set above or any other that you find useful. In class I will try to make the material accessible and interesting for all.

All books will be placed on reserve in McKeldin. All readings are recommended, not required, though I am quite certain that you will not be able to learn solely from the material I supply in class and in my lecture notes. Readings below are listed in sequence of their relevance for the material covered in class: (1) denotes the most important/relevant, (2) less so, etc. Some will be very helpful, some will be plain auxiliary. You may want to read stuff, should you choose to do at all, either before it is covered in class or after. The basic rule about this class is: the way you choose to learn is at your discretion.

SCHEDULE OF TOPICS AND RELATED READINGS

WEEK 1 (January 28)
Axiomatic (Formal) Theory: Examples of Topics, Methods, and Solutions

(1a) Lecture notes (to be posted on the web.)
(1b) Raymond Wilder, The Axiomatic Method, pages 1621-1640 (in "The World of Mathematics," Simon and Schuster, New York, 1956.)
(1c) Review of Mathematics from Watson's textbook (don't worry about derivatives.)
(2) David Lalman, Joe Oppenheimer and Piotr Swistak, Formal Rational Choice Theory: A Cumulative Science of Politics, in Political Science: State of the Discipline, APSA: Washington DC, 1993, pp.77-104.

WEEK 2 (February 4)
Choice under Certainty: Theory of Preferences

(1a) Lecture notes (to be posted on the web.)
(1b) David Kreps' "Notes on the Theory of Choice," Westview, 1988, pp. 1-28.

WEEK 3 (February 11)
Choice under Uncertainty: Von Neumann-Morgenstern Expected Utility Theory and the Foundation of Game Theory

(1) Lecture notes (to be posted on the web.)
(2) David Kreps' "Notes on the Theory of Choice," Westview, 1988, pp. 31-68 (as much as you find helpful and/or overlapping with what we have covered in class.)

WEEK 4 (February 18)
Game Theory: Primitive Terms, Their Properties and Interpretations

(1) Dixit and Skeath Chapters1 and 2.
(2) Watson Chapter 1.
(3) Osborne and Rubinstein Chapter 1.
The three readings will give you a good idea of the level of explanation each of the textbooks:

from very leisurely and easy (1), through very succinct and to the point (2), to (3) that may only be tolerable to those who are used to this type of presentation. Each has its good and bad sides. It may be a good time for you to look at all and start thinking about which one may fit you best.

WEEK 5 (February 25)

Sequential Games, Rollback Equilibria, Subgame Perfection

(1) Dixit and Skeath Chapter 3.
(2) Watson Chapters 2, 14 and 15.
(3) Osborne and Rubinstein Chapter 6.

WEEK 6 (March 3)

Simultaneous-Move Games, Pure Strategies: Dominance Solvability, Nash Equilibria, Rationalizability

(1) Dixit and Skeath Chapters 4, 5, 6.
(2) Watson Chapters 4, 5, 6, 7 and 9.
(3) Osborne and Rubinstein Chapters 2 92.1-2.4), 4, 5.

WEEK 7 (March 10)

Simultaneous-Move Games, Mixed Strategies

(1) Dixit and Skeath Chapters 7, 8.
(2) Watson Chapters 5 (again), 11, 12.
(3) Osborne and Rubinstein Chapter 3.

WEEK 8 (March 17)

SPRING BREAK

WEEK 9 (March 24)

Simultaneous-Move Games, Mixed Strategies Continued

WEEK 10 (March 31)

Repeated Games, Finite and Infinite. Folk Theorems

(1) Dixit and Skeath Chapter 11.
(2) Watson Chapter 22.
(3) Osborne and Rubinstein Chapter 8.

WEEK 11 (April 7)

Evolutionary Games. ESS, Weak ESS and Other Forms of Stability. Evolutionary Folk Theorems and Basins of Attraction

(1) Dixit and Skeath Chapter 13.
(2) Bendor and Swistak (1997)

WEEK 12 (April 14)

Robust Equilibria and Preference Formation

Bendor and Swistak (2001)

WEEK 13 (April 21)

Uncertainty and Information: Bayesian Pooling and Separating Equilibria

(1) Dixit and Skeath Chapter 9, 10.
(2) Watson Chapters 24, 25, 26, 27.
(3) Osborne and Rubinstein 11, 12.

WEEK 14 (April 28)

Bargaining Games

(1) Dixit and Skeath 17.
(2) Watson Chapters 18.
(3) Osborne and Rubinstein 15.

WEEK 15 (May 7)

Mechanism Design and Tying Up Some Loose Ends