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502: MICROECONOMIC THEORY II

This course serves as an introduction to noncooperative game theory. We will learn the fundamental concepts of game theory, as well as some well-known results and applications.

GRADING: Grades are based on homework assignments and two exams. On the homework assignments, you are **strongly encouraged** to work in groups. Every student should try to solve all problems on his or her own, but a group, which may include an arbitrary number of you, turns in assignments collectively. Thus, you will divide up the duty of writing the answers to the problems within the group.

You may **not** work on the exams as groups. Exams will be individual, in class, and closed-book.

TEXT: The text for the course is *Microeconomic Theory* (Oxford University Press, 1995), by Mas-Colell, Whinston and Green. You may already own a copy of this book from Microeconomics I.

There are several other books that offer a broad treatment of game theory. Each of them has strengths and weaknesses. If you are curious about something from the course and want an additional source of information and examples, I encourage you to consult these books. I list some below, with a brief evaluation of them:

Fudenberg and Tirole, *Game Theory*, MIT Press, 1991. Comprehensive and extremely detailed. A good source for precise definitions. Harder to read than our textbook.

Gibbons, *Game Theory for Applied Economists*, Princeton University Press, 1992. Contains many nice intuitive explanations and examples. Lacks formal definitions of some of the concepts it covers.

Kreps, *A Course in Microeconomic Theory*, Princeton University Press, 1990. Its strength is examples and deep discussion of the more subtle aspects of game theory. Written at a high level; may be hard to follow.

Myerson, *Game Theory: Analysis of Conflict*, Harvard University Press, 1992. Similar to Fudenberg and Tirole, but with less coverage. Contains many interesting examples.

Osborne and Rubinstein, *A Course in Game Theory*, MIT Press, 1994. Very nicely written. Covers some topics not found in the other books.

In addition to the text, we will cover several important articles. These are listed in the course outline below; all are available online with free access through the Rutgers library.

ACADEMIC INTEGRITY: Rutgers University has explicit rules governing academic integrity, the full details of which you can find at <http://academicintegrity.rutgers.edu/academic-integrity-policy/> For the purposes of our class, the most important restrictions are that homework solutions be written in your own words, rather than copied from existing solutions (though, as stated above, collaboration with your classmates on homework is encouraged), and that you may not use notes or look at other students' work when taking exams. The procedural consequences of violations are spelled out at the website.

COURSE CURRICULUM: The core material for the course is covered in chapters 7, 8 and 9 in the textbook. We will also study selected topics in other chapters, as well as some original articles. An outline for the course appears below. The amount of extra material we cover at the end of the course is subject to time constraints.

Topic	Readings
I. Introduction	Part II Introduction;
A. The elements of a game	7.A, 7.B
B. Solution concepts: generalities	
II. Simultaneous-move games	8.A
A. Dominance	8.B
1. Dominant strategy equilibrium	
2. Iterated Deletion of Dominated Strategies	
3. Dominance Solvability	
III. Dynamic games	
A. The extensive form	7.C
B. The normal form	7.D
C. Backward induction	9.B
IV. Mixed strategies	7.E
V. Best-response behavior	
A. Rationalizability	8.C
B. Nash equilibrium	8.D
1. Pure strategy Nash equilibrium	
2. Mixed strategy Nash equilibrium	
3. Existence	8 Apdx. A
VI. Nash refinements: complete information	
A. Trembling-hand perfection	8.F
B. Subgame perfection	9.B
VII. Repeated games	12 Apdx. A
A. Discounted payoffs	
B. The folk theorem	
VIII. Bargaining	9 Apdx. A

Paper: Rubinstein, A. (1982). "Perfect Equilibrium in a Bargaining Model." *Econometrica* **50**: 97-109.

Topic	Readings
IX. Bayesian games	
A. Simultaneous move	8.E
1. Bayesian Nash equilibrium	
B. Dynamic	
1. In extensive form	7.C
2. Beliefs	9.C
3. Sequential rationality	
4. Perfect Bayesian equilibrium	
5. Sequential equilibrium	
6. Belief refinements and forward induction	9.D
X. Mechanism design	23.A, 23.B
A. The revelation principle	23.C, 23.D
B. Dominant strategy implementation	23.C
Paper: Groves, T. (1973). "Incentives in Teams." <i>Econometrica</i> 41 : 617-631.	
C. Bayesian implementation	23.D
D. Participation constraints	23.E
Paper: Myerson, R.B., and M.A. Satterthwaite. (1983). "Efficient Mechanisms for Bilateral Trading." <i>Journal of Economic Theory</i> 29 : 265-281.	
XI. Repeated games with imperfect observability	
Paper: Green, E., and R. Porter. (1984). "Noncooperative collusion under imperfect price information." <i>Econometrica</i> 52 : 87-100.	
XII. Firm entry and the competitive limit	12.F
XIII. Markets and asymmetric information	13.A
A. Adverse Selection	13.B
Paper: Akerlof, G. (1970). "The Market for Lemons: Quality Uncertainty and the Market Mechanism." <i>Quarterly Journal of Economics</i> 84 : 488-500.	
B. Signaling	13.C
Paper: Spence, A. M. (1973). "Job Market Signaling." <i>Quarterly Journal of Economics</i> 87 : 355-374.	
C. Screening	13.D
Paper: Rothschild, M., and J. E. Stiglitz. (1976). "Equilibrium in Competitive Insurance Markets: An Essay in the Economics of Imperfect Information." <i>Quarterly Journal of Economics</i> 90 : 629-649.	