



Dartmouth College
Department of Economics
Winter 2008

Econ 35: Games and Economic Behavior

Section 1: Meets in the 10A slot, Tuesday and Thursday, 10:00–11:50 a.m., in Rockefeller Room 1. X-hour on Wednesday, 3:00–3:50 p.m.

Section 2: Meets in the 2A slot, Tuesday and Thursday, 2:00–3:50 p.m., in Rockefeller Room 1. X-hour on Wednesday, 4:15–5:05 p.m.

Professor: Christopher Snyder. Office hours: Wednesday 10:00–11:45 a.m. and 1:45–3:00 p.m.; Silsby 312A; telephone 646–0642; email Christopher.M.Snyder@dartmouth.edu; webpage <http://www.dartmouth.edu/csnyder>.

Readings: The required text is Eric Rasmusen, 2007, *Games and Information: An Introduction to Game Theory*, 4th edition, published by Blackwell, available for purchase in the bookstore. The supplementary text, from which we will use a few selected chapters, is Walter Nicholson and Christopher Snyder, 2008, *Microeconomic Theory: Basic Principles and Extensions*, 10th edition, published by Thomson South-Western. As a coauthor on the book, I have permission to circulate electronic copies of the relevant chapters (8, 15, and 18) to my students free of charge. Copies of these chapters plus the handful of journal articles on the reading list, will be available as links on Blackboard.

Overview and Philosophy Game theory has become one of the central tools in modern economic theory, used widely in all subfields of economics, including development, labor, macroeconomics, finance, international trade, and industrial organization, and increasingly used in sociology, political science, and other social sciences. This course will provide you with the basic tools to help you pose and solve problems using game theory and to read articles that employ game theory in any of these subfields. See the course outline below for a list of the core topics that we will cover.

We will have mainly an applied focus, learning the theory by considering examples. We will not be able to avoid mathematics, however. Analyzing the applications will sometimes require involved calculations. We will also take a detour here and there to state important concepts and theorems using formal notation. In a few cases in which the arguments are not too involved, we will even prove a theorem or two to give you the flavor at least of some of the mathematics involved.

Many of the applications will be drawn from industrial organization because the course is part of the industrial organization sequence (Econ 25, 35, 45) and because industrial organization happens to be my main research interest. However, we will also cover applications from other subfields of economics including labor economics, development, law and economics, other social sciences, and indeed even parlor games and examples from movies.

We will spend much of our time solving problems but will also practice the proper way to speak and write about game theory. Besides solving problems that are handed to us, we will practice condensing practical situations into games, which we can then go on to solve.

Prerequisites Intermediate microeconomics (Econ 21), Calculus I (Math 3), and elementary probability and statistics (Econ 10 is sufficient preparation); or permission of instructor.

Course Requirements

- *Participation and attendance:* Students are expected to attend all classes and scheduled X-hours. To preserve precious class time, we will start promptly at the beginning of the period. Please show up on time to avoid disruptions. Students are expected to be prepared by looking at the assigned readings and completing the problem sets in advance of the relevant class and to participate enthusiastically in discussions. While attendance and participation do not figure into the raw score for the class, I will keep a log for each student and will use this log for students who will later ask for letters of recommendation and to determine letter grades for students whose raw scores fall on a cutoff. Students with perfect attendance will be eligible for a token reward (one extra credit point).
- *Problem sets:* About ten problem sets will be assigned. Student solutions will not be collected and graded. Instead, I will distribute detailed answers to the problem sets (which can be reviewed in class and in office hours if there are further questions). The solutions will sometimes omit the answers to some questions, often those marked “hard.” These questions are provided as a challenge for students to puzzle over. Either a detailed answer will be provided at some point in the term or the problem will not be required for exams. Students who solve all or a large proportion of these “hard” questions will be eligible for a token reward (an extra credit point).

- *Exams:* There will be two in-class midterm exams and a final exam. Midterms will not be comprehensive, but will only cover the module leading up to the exam. The final exam will be comprehensive, including a number of questions covering the last third of the material not covered by previous midterms and several questions covering earlier material or providing a synthesis of the course material. The final exam will be scheduled by the registrar for the “Economics Joint B” slot: March 11, 3:00 p.m. Let me know right away if you have a conflict for this time and we can begin making alternative arrangements.
- *Projects:* Students will pair up into study groups of two students each to collaborate on two term projects. The first project will require students to download and use a free software package (Gambit) to solve for equilibrium in a number of games and turn in hardcopies of printouts of their results. Gambit is a sort of “game theory calculator” that you may find useful in the remainder of the term and for other course work. The second project is a term paper of about six pages due near the end of the term. The topic will cover the current standards war between high-definition media formats (HD-DVD and Blu-Ray), analyzing whether theory or analogies to previous standards wars can help predict the outcome of this war. Papers will be graded on topic interest, analytical rigor, and quality of writing style and grammar. Extensions on the projects’ deadlines will carry a penalty (automatic grade reduction).
- *Classroom Experiments:* In selected classes, students will participate as subjects in classroom games to illustrate important principles or test how the theory applies in practice. Token extra credit of up to two points are available to provide economic incentives for participation in the games. For each game, a student score will be computed by matching each against all other students in the other section and taking the average of his or her payoff across these matches. An aggregate score for student i , x_i , will be computed by totaling scores across all games in the term. Letting \underline{x} be the lowest and \bar{x} be the highest aggregate score within a section, the extra credit reward is computed according to the formula

$$2 \left(\frac{x_i - \underline{x}}{\bar{x} - \underline{x}} \right).$$

According to this formula, the highest scorer in a section will earn 2% extra credit, the lowest 0%, and students in between in proportion to where they fall in the range. The scheme has been carefully designed so that you do not have direct incentives to harm your opponent in each game but just to maximize your own payoff, since you are matched against subjects from the other section with whom you do not compete in a tournament.

Grading

Midterm exam 1	25%
Midterm exam 2	25%
Gambit project	5%
Term paper	10%
Final exam	35%
Classroom experiments	+2% extra credit
Hard problems	+1% extra credit
Perfect attendance	+1% extra credit

Academic Integrity Students are expected to abide by the honor code. The following are details on academic integrity as it relates to this class. Exams will be closed-book; collaboration on examinations is prohibited. Students may obtain help from others on problem sets and are indeed encouraged to work together on them in study groups. Each group must work on the projects independently, but students within the group can of course work together freely.

X-Hour We will use the x-hour from time to time to make up for a class that has to be cancelled due to weather or the professor's professional activities, to conduct a review session, to conduct a classroom experiment, to give an exam, or to catch up on material. Please keep the time free in your schedule. Some x-hours have already been marked down on the schedule below.

Blackboard Handouts and problem sets will be distributed in class. Where possible, they will also be made available afterwards on Blackboard.

Disabilities Students with learning, physical, or psychiatric disabilities enrolled in this course that may need disability-related classroom accommodations are encouraged to make an office appointment to see me before the end of the second week of the term. All discussions will remain confidential, although the Student Disability Services office may be consulted to discuss appropriate implementation of any accommodation requested.

Outline of Course

Date	Content	Reading	Assignment
Jan. 8	Introduction	ch. 0	
Jan. 10	Rules of the game	ch. 1	Problem Set 1 assigned (PS 1)
Jan. 15	Rules of the game		
Jan. 16(x)	Gambit assignment		Gambit project assigned
Jan. 17	Information	ch. 2	
Jan. 22	Information	Friedman (1998)	
Jan. 24	Mixed strategies	3.1–3.4 Chiappori, et al. (2002)	PS 3
Jan. 29	Continuous strategies	3.5, p. 436, pp. 441–449 NS ch. 15	PS 4
Jan. 30(x)	Midterm exam 1		
Jan. 31	Subgame perfection	ch. 4	PS 5, Gambit project due
Feb. 5	Repeated games	ch. 5	PS 6
Feb. 7	Repeated games		
Feb. 12	Signaling games	ch. 6, ch. 11, NS ch. 8	PS 7
Feb. 14	Signaling games		
Feb. 19	Moral hazard	ch. 7–8	PS 8
Feb. 20(x)	Midterm exam 2		
Feb. 21	Moral hazard	Brown (2007)	
Feb. 26	Adverse selection	ch. 9, NS ch. 17	PS 9
Feb. 28	Adverse selection		Term paper due
Mar. 4	Auctions	ch. 13	PS 10
Mar. 6	Auctions	Lucking-Reiley (1999)	
Mar. 11	Final Exam 3:00 p.m.		

Articles

- Anderson, S. and M. Engers. (2007) “Participation Games: Market Entry, Coordination, and the Beautiful Blonde,” *Journal of Economic Behavior and Organization* 63: 120–137. (Involved in Gambit project.)
- Brown, J. (2007) “Quitters Never Win: The (Adverse) Incentive Effects of Competing with Superstars,” U.C. Berkeley mimeo.
- Chiappori, P.-A., S. Levitt, and T. Groseclose. (2002) “Testing Mixed-Strategy Equilibria When Players Are Heterogeneous: The Case of Penalty Kicks in Soccer,” *American Economic Review* 92: 1138–1151.
- Friedman, D. (1998) “Monty Hall’s Three Doors: Construction and Deconstruction of a Choice Anomaly,” *American Economic Review* 88: 933–946.
- Lucking-Reiley, David. (1999) “Using Field Experiments to Test Equivalence between Auction Formats: Magic on the Internet,” *American Economic Review* 89: 1063–1080.