

Economics 109, Game Theory

Spring 2011 Syllabus

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Course description

In this course we will study strategic situations, in which each player's behavior can affect the well-being of the other players. "Strategy" is the process of deciding how to act in these situations, taking into account the likely behavior of the other players. "Game theory" is the study of strategic situations, using a general framework and tools that can be applied across the entire range of situations. In addition to exploring abstract theory, we will also consider a variety of applications from economics, political science, and other fields.

Logistics

- **Lectures:** Monday, Wednesday, and Friday, 10:00–10:50am, in Center Hall 113
- **Sections:** Mondays, 7:00–8:50pm, in the Cognitive Science (CSB) 002
- **Course email address:** Econ109UCSD@gmail.com
Monitored by the TAs. Use this address rather than emailing the instructors directly.
- **Course web site:** WebCT, <http://webct.ucsd.edu>
Students are responsible for reading course announcements, lecture slides, and other materials posted on WebCT. No handouts will be distributed in class; please download them yourself. In addition, required quizzes and optional bonus activities are administered through WebCT. UCSD students use your regular username and password to log in. If you have difficulty accessing the website, contact iwdc@ucsd.edu. For other website issues, please email Econ109UCSD@gmail.com. Audio-only lecture podcasts are at <http://podcast.ucsd.edu/>.
- **Required textbook:** *Strategy: An Introduction to Game Theory*, 2nd. Edition, Joel Watson, New York: W. W. Norton, 2007.

Instructors & Office hours

Permanent office hours will be determined by a class poll. Temporary office hours for the first two weeks are listed below.

- **Professor: David A. Miller.** Temporary office hours: Wednesdays and Fridays, 11:00–noon in Econ 228.
- **TA: Tim Keller.** Temporary office hours: Thursdays, 2:00–3:00 in Sequoyah 140
- **TA: Ben Horne.** Temporary office hours: Tuesdays, 1:00–2:00 in Econ 120
- **TA: Ryan Fuller.** Temporary office hours: Mondays, 2:00–4:00 in Sequoyah 139

Registering

- **Prerequisites:** Econ 100C (intermediate micro) or Math 109 (mathematical proofs) or Math 31CH (honors calculus) or [CSE 20 (discrete math) and Math 20C (multivariable calculus) and permission of instructor].

If you are a graduate student or an exchange student and are unable to register on TritonLink, send an email to Econ109UCSD@gmail.com or go to Prof. Miller’s office hours to discuss your situation. No other exceptions will be made.

- **Adding the course:** “After the University add deadline, students with extraordinary circumstances or with documentation of a university error may petition the Department of Economics to add courses. Extraordinary circumstances do not include: not being added to the course from the waitlist, forgetting to add a course, etc. Students with an extraordinary circumstance may submit a completed petition, with a written explanation (and documentation, if applicable) to Sequoyah Hall room 245.” (Economics Department policy, effective Fall 2010)

Assignments

- **Weekly quizzes (about 140 points):** There will be roughly ten quizzes. You will have a window of several days in which to take each quiz, but once you start a quiz there will be a strict time limit. Each quiz can be worth up to 30 points, with an average of about 15 points. No collaboration is allowed. Quizzes are administered through WebCT.
- **Two midterm exams (300 points):** Two in-class midterm exams, 150 points each, on Wednesday, April 13th and Monday, May 9th
- **Final exam (500 points):** Monday, June 6th, 8:00–11:00am, location TBA
- **Grading:** All students are ranked by total points, and a skewed normal distribution is fitted to the empirical point total distribution.¹ The curve reflects the advanced, elective nature of the class and accounts for the fact that a disproportionate number of excellent students take the class. Grades are assigned to quantiles of the fitted distribution according to the following cutoffs:

A+ 97%; A 88%; A– 67%; B+ 45%; B 30%; B– 20%; C+ 12%; C 8%; C– 5%; D 3%

That is, in expectation 33% of the class will get some sort of A grade, 47% will get some sort of

¹Students who dropped or withdrew from the class will be counted at 20% weight toward the curve if they completed one midterm exam, and 40% if they completed two midterm exams.

B grade, 25% will get some sort of C grade, etc. Actual outcome may differ from expectations.

- **Bonus points:** During the course, bonus points are assigned for various optional activities. Bonus points are counted only after the letter grade cutoffs have been assigned. Thus your letter grade will not be hurt if you earn fewer bonus points than your classmates.

Class rules

- **Collaboration:** No collaboration is allowed on quizzes and exams.
- **Electronic devices:** Cell phones, computers, music players, and other such devices must be silent during class. No electronic devices may be used for personal entertainment during class.
- **Academic honesty:** Academic dishonesty is grounds for a reduced or failing grade on the assignment or for the course. Students are reminded of the UCSD Policy on Integrity of Scholarship, at <http://senate.ucsd.edu/manual/appendices/app2.htm>.

Lecture outline

Lecture notes are organized by unit numbers, on the left. We will move quickly through Parts I–II, then more methodically through Parts III–IV.

Part I: Representing Games

1. Extensive form (ch. 2)
2. Normal form (ch. 3)
3. Tools (ch. 4)

Part II: Static Settings

4. Dominance (“rationality” from ch. 5, “dominance” from ch. 6)
5. Rationalizability (“common knowledge” from ch. 5, chs. 7–8)
6. Cognitive hierarchies (“best response” from ch. 6)
7. Nash equilibrium (chs. 9–10)
8. Mixed strategy Nash equilibrium (ch. 11)

First Midterm Exam

Part III: Dynamic Settings

9. Subgame perfection (chs. 14–15, review ch. 2)
10. Applications of subgame perfection (ch. 16)
11. Bargaining (chs. 18–19)
12. Negotiation equilibrium (chs. 20–21)
13. Repeated games (chs. 22–23)

Second Midterm Exam

Part IV: Incomplete Information

19. Bayesian Nash equilibrium (ch. 24, 26)
20. Lemons & auctions (ch. 27)
21. Perfect Bayesian equilibrium (ch. 28)
22. Signaling (ch. 29)

Final Exam