

Economics 109: Game Theory
Fall 2019 (Sessions A00 and B00), Professor Joel Watson

This course examines strategic situations, in which each agent's behavior generally affects the well-being of the other agents. Game theory is a technical framework for rigorously analyzing decision-making in such settings. Almost every type of interaction between living things is strategic. As social scientists, we focus on human interaction, and we shall assume that people behave in a rational, deliberate manner. In addition to exploring theory in the abstract, we will consider a variety of applications from economics, political science, and law.

Schedule: The topics covered in this course will be presented in a hybrid format, with flexible use of the classroom time and lectures delivered on line. The meeting schedule is Tuesdays and Tuesdays 8:00 – 9:20 a.m. (A00) or 9:30 – 10:50 a.m. (B00) in Peterson Hall 104, with discussion sessions on Fridays 3:00 – 3:50 p.m. (A01) in Peterson 104 or Wednesdays 7:00 – 7:50 p.m. (B01) in WLH 2204. Some lectures may be podcast at <http://podcast.ucsd.edu/>. *Students are required to attend the lecture session that they are enrolled in.* Watson will record attendance and cold-call students during lectures. There will be no class meetings on university holidays.

Examinations: There will be two midterm exams and a final exam, and additionally a few short on-line or in-class quizzes. The midterm exams will take place on Monday 21 October 2019 and Monday 18 November 2019 at 8:00 – 9:20 p.m. in Center Hall 101 (for both A00 and B00). The final exam will be on Saturday 07 December 2019 at 8:00 – 11:00 a.m. Note that the quiz times may be randomly determined.

Problem Sets: Problem sets will be assigned but not collected. Students will be expected to complete a variety of the textbook exercises, including all of the ones with solutions in the textbook (Exercises 1, 3, 5 and 9 from each chapter).

Grading Weights: The course will be graded on the curve according to Econ Department standards for Econ 109, which is roughly a 2.9 average GPA for the class and about 25-30 percent A grades. Watson will also track the performance of students who regularly participate in class and attend office hours and extra sessions. At the end of the quarter, Watson may adjust the grading cutoffs downward to ensure that grades are set appropriately for this sample of students, which can only increase grades for other students in the class. Grading weights: quizzes and participation 36%, midterm exams 32%, final exam 32%.

Required Textbook: Watson, J., *Strategy: An Introduction to Game Theory* (W.W. Norton), **THIRD EDITION.**

Class Website and Watson's Office Hours: Materials will be posted at <https://canvas.ucsd.edu/> on the page for Economics 109. Students should log in regularly to follow the schedule, access video lectures, and check for announcements. Initially, Watson's office hours will be on Tuesdays from 1:00 until 2:20 p.m. in Sequoyah Hall 244, and by appointment. If during this time you do not find Watson in Sequoyah Hall 244, please go to Econ 310. Watson may eventually change the office-hour schedule and offer on-line office hours.

Teaching Assistants: Xiameng Hua (Sequoyah Hall 207, x5hua@ucsd.edu), Christian Bechler (cbechler@ucsd.edu); and Wanchang Zhang (Econ 115, waz024@ucsd.edu). Additional graders: Giampaolo Bonomi (gbonomi@ucsd.edu) and Chen Lin (chl029@ucsd.edu).

Procedure for Questions: It is best to ask questions in class and in office hours. The TAs will work out a procedure for responding to questions submitted by email or through the course Canvas site. Do not send emails to Professor Watson except to inform him of urgent matters relating to the course (such as letting him know of an illness that necessitates missing an examination).

Additional Policies:

- (1) Incidents in which students are suspected of cheating on exams will be reported to the administration.
- (2) Students have one week from the day in which the midterm examinations and quizzes are graded to report errors in grading and/or to request that problems be re-graded. If a student submits his/her exam for re-grading, then the student's entire exam will be re-graded by the professor (with no guarantee of a higher total score).
- (3) Students should attend and participate in class, but not use their mobile phones and other devices in class except to take notes. The professor will employ the necessary means to discourage classroom distractions. Students whose behavior impedes classroom interaction, attempt to smoke in class, or are disruptive in other ways will be disciplined and may be de-enrolled as university policy allows.
- (4) Tests (examinations and quizzes) will take place during scheduled class times (lectures and discussion sessions) that appear on the official University course schedule. Students are required to attend lectures and discussion sessions on the days in which tests are held. Students missing a test will be given a zero score for the test. No one will be excused from this rule, except in cases of urgent and serious health issues as well as for exceptions required by university policy. If a student cannot attend an examination or quiz due to an urgent health problem, then the student must report this to the professor as soon as possible. Following the health incident, the student must present documentation to provide evidence that the health incident precluded taking the test (a physician's note is typically sufficient). The student will then be excused from the test and his or her course grade will be determined by appropriately scaling up the grades earned on the other tests. If the missed test is the final examination, then the student will be given an incomplete grade and will have to take the final examination set for the next offering of Econ 109 (in the following quarter) to complete the course.

Understanding the Course Prerequisites:

Students are required to enter Econ 109 with a full understanding of the material covered in Econ 100abc, which include the following game-theory topics presented in Econ 100c:

- Normal-form (matrix) and extensive-form representations [familiarity with]
- Strategies and mixed strategies [operational understanding]
- Best response and dominance [definitions and operational understanding]
- Iterated dominance [definition and operational understanding]
- Nash equilibrium [definition and calculations, also for games requiring calculus]
- Cournot and Bertrand models of oligopoly [ability to calculate the Nash equilibria]
- Mixed-strategy Nash equilibrium [definition and ability to compute for 2x2 games]
- Backward induction and subgame perfection [rudimentary knowledge]
- Stackelberg oligopoly model [ability to calculate the subgame-perfect equilibrium]
- Adverse selection [rudimentary understanding, in particular of lemons markets]
- Moral hazard [rudimentary understanding]

These topics will be presented in Econ 109 at a deeper level than they are covered in Econ 100c. In some cases, Econ 109 will offer a review of what the students learned in Econ 100c, but it will be a rapid review. In other cases, the coverage in Econ 109 will begin where the Econ 100c coverage ended, and so the students must understand these topics at the Econ 100c level before the relevant Econ 109 lectures. Econ 109 also covers more advanced topics and applications that are not covered in Econ 100c.