Econ 4349: Introduction to Game Theory
Department of Economics, University of Houston
Fall 2025

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Over the past 50 years Game Theory revolutionized economics and other social sciences, including political science, sociology and psychology. Recognized multiple times by the Nobel Prize in economics, Game Theory is a "language" one can use to understand any situation where strategic decision-makers interact: firms, politicians, countries, family members, drivers in traffic, lawmakers and criminals, teachers and students, conflicting interests within the same person.... and so on.
This course is designed to introduce students to the main tools of Game Theory and to some of their applications.

Prerequisites

Intermediate Microeconomics (ECON 3332). In addition, you need to be very comfortable with algebra and know basic probability concepts (random variables, probability distribution, independent events, etc.) as in, e.g., ECON 2370. Prior knowledge of calculus is not required.

Course policies and grading

This course requires you to work more or less at a constant pace throughout the semester. If you regularly miss class or problem sets, you will fall behind very quickly. Because later material builds on earlier material, once you fall behind, catching up will be extremely difficult. Please do not take this class unless you will have time to attend the lectures, work on the problem sets, and study the material for a few hours every week outside of class.

Your grade will have four components: 3 exams, and a series of problem sets. Each of these components is worth 25% of your total score. The 3 exams will be on 9/29, 10/27, and 12/3. Problem sets will be due in class every Monday starting 9/8, except on days with an exam. I will drop your problem set with the lowest score when computing your grade.

Based on your total score in the class, out of 100, your grade will be determined as follows:
A: 85 and above, A-: 80-84, B+: 75-79, B: 65-74, B-: 60-64, C+: 55-59, C: 45-54, C-: 40-44, D+: 35-39, D: 25-34, D-: 20-24, F: 19 or less. There is no curve, but I reserve the right to lower these ranges. Typically between half and two thirds of the students in the class earn a grade of B- or better (not counting W's).

Problem sets will be posted in Canvas. You are encouraged to discuss the problem sets with your classmates, but every student has to write up and submit their own individual solutions. Be careful to use any study group discussion as a complement to, not a substitute for, studying on your own. Keep in mind that your classmates or the TA will not be there to discuss your solutions during the exams.
Neither I nor the TA will answer questions related to a problem set on the day it is due.

Late assignments will not be accepted. Any absence from an exam must be documented by a doctor or approved by me in advance. If you believe there is a grading error in your exam (other than the summing of the points), you can submit it for re-grading within one week after receiving your exam back. Briefly describe the error in writing; I will then re-grade the entire exam (not just a single problem).

Students are responsible for being familiar with, and abiding by, the university's Academic Honesty Policy (https://www.uh.edu/provost/policies-resources/honesty/). Faculty have the responsibility of reporting incidents of alleged academic dishonesty. I would hate, but will not hesitate, to do this so please do not put me in this situation.

Various requests

In order to make our time together as pleasant as possible and to make sure that everybody gets the most out of this class, please observe the following requests.

1. Please be on time. Late arrivals are distracting to both me and your fellow students.
2. Please do not leave before the end of class. This is also very distracting.
3. During exams, if you finish early, please leave as quietly as possible. Please do not leave in the last 10 minutes (so if you finish 8 minutes early, please wait 8 minutes before you leave).
4. If you miss a class, please make sure you review what you missed before asking questions on the next class.

University policies

Mental Health and Wellness Resources. The University of Houston has a number of resources to support students' mental health and overall wellness, including CoogsCARE and the UH Go App. UH Counseling and Psychological Services (CAPS) offers 24/7 mental health support for

all students, addressing various concerns like stress, college adjustment and sadness. CAPS provides individual and couples counseling, group therapy, workshops and connections to other support services on and off-campus. For assistance visit uh.edu/caps, call 713-743-5454, or visit a Let's Talk location in-person or virtually. Let's Talk are daily, informal confidential consultations with CAPS therapists where no appointment or paperwork is needed. The Student Health Center offers a Psychiatry Clinic for enrolled UH students. Call 713-743-5149 during clinic hours, Monday through Friday 8 a.m. - 4:30 p.m. to schedule an appointment. The A.D. Bruce Religion Center offers spiritual support and a variety of programs centered on well-being. **Need Support Now? If you or someone you know is struggling or in crisis, help is available. Call CAPS crisis support 24/7 at 713-743-5454, or the National Suicide and Crisis Lifeline: call or text 988, or chat 988lifeline.org.**

Academic Honesty Policy. High ethical standards are critical to the integrity of any institution, and bear directly on the ultimate value of conferred degrees. All UH community members are expected to contribute to an atmosphere of the highest possible ethical standards. Maintaining such an atmosphere requires that any instances of academic dishonesty be recognized and addressed. The UH Academic Honesty Policy is designed to handle those instances with fairness to all parties involved: the students, the instructors, and the University itself. All students and faculty of the University of Houston are responsible for being familiar with this policy.

Title IX/Sexual Misconduct. Per the UHS Sexual Misconduct Policy, your instructor is a "responsible employee" for reporting purposes under Title IX regulations and state law and must report incidents of sexual misconduct (sexual harassment, non-consensual sexual contact, sexual assault, sexual exploitation, sexual intimidation, intimate partner violence, or stalking) about which they become aware to the Title IX office. Please know there are places on campus where you can make a report in confidence. You can find more information about resources on the Title IX website at https://uh.edu/equal-opportunity/title-ix-sexual-misconduct/resources/.

Reasonable Academic Adjustments/Auxiliary Aids. The University of Houston is committed to providing an academic environment and educational programs that are accessible for its students. Any student with a disability who is experiencing barriers to learning, assessment or participation is encouraged to contact the Justin Dart, Jr. Student Accessibility Center (Dart Center) to learn more about academic accommodations and support that may be available to them. Students seeking academic accommodations will need to register with the Dart Center as soon as possible to ensure timely implementation of approved accommodations. Please contact the Dart Center by visiting the website: https://uh.edu/accessibility/ calling (713) 743-5400, or emailing jdcenter@Central.UH.EDU.

Excused Absence Policy. Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the

University of Houston [Undergraduate Excused Absence Policy](#) and [Graduate Excused Absence Policy](#) for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to [military service](#), [religious holy days,](#) [pregnancy and related conditions](#), and [disability](#).

Recording of Class. Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the [Justin Dart, Jr. Student Accessibility Center](#). If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with anyone without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Textbooks

Martin Osborne: *An Introduction to Game Theory*, Oxford University Press, 2004. (O)
  Chapters 1-6 and a solution manual are freely available on the author's website at
  https://www.economics.utoronto.ca/osborne/igt/index.html

Giacomo Bonanno: *Game Theory*, 2024. (B)
  Freely available on the author's website at
  http://faculty.econ.ucdavis.edu/faculty/bonanno/GT_Book.html

Course Outline (recommended readings in parentheses)

1 Static games of complete information
1.1 Strategic form and dominance
  Strategic form representation; Dominance and iterated elimination (O 2.1-2.5, 2.9 / B 2.1-2.2)
  Application: Auctions (O 3.5 / B 2.3)
  Iterated elimination (B 2.5)

1.2 Nash equilibrium and applications
Basic concepts (O 2.6-2.8 / B 2.6)
Coordination problems and policy
Public goods
Oligopolies (O 3.1-3.3 / B 2.7)
Electoral competition (O 3.3)
Law and economics (O 3.6)
Extension: mixed strategies (O 4.2-4.4)

2 Dynamic games of complete information
2.1 Basic theory
Extensive form representation; Backward induction (O 5 / B 3.1-3.2)
2.2 Applications
Entry and commitment
Ultimatum games and the holdup problem (O 6.1)
Dynamic oligopolies (O 6.2)
Vote buying (O 6.3)
Impatience and procrastination
2.3 Theory: imperfect information
Subgame Perfect Nash Equilibrium (O 7.1 / B 4.1-4.4)
2.4 Applications
Bank runs
Entry and market size (O 7.2)
2.5 Repeated games
Basic concepts (O 14.1-14.3)
Finite repetitions
Infinite prisoner's dilemma (O 14.5-14.6, 14.9-14.10)
Application: collusion in oligopolies

3 Games of incomplete information
3.1 Static games
Basic concepts (O 9.1-9.2)
Application: the value of information (O 9.3)
Application: Cournot competition with asymmetric information (O 9.4)
3.2 Dynamic games
Basic concepts (O 10.4)
Signaling games (O 10.5)
Application: education as a signal