

Game Theory with Applications to the Natural and Social Sciences Syllabus – Spring 2022

Syllabus information may be subject to change. An up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: Game Theory with Applications to the Natural and Social Sciences

Credits: 3

Format/location: In-Person and meet in MCUH 107.

Date and Time: Tuesdays and Thursdays 12:30PM - 1:45PM.

Note: Not open to students who have passed ECON 2201 or 2202.

Not recommended to students who have already taken a game theory course.

Course: website on HuskyCT

Instructor: Talia Bar, Associate Professor of Economics

Email: talia.bar@uconn.edu

Telephone: 860 486 3550.

Talia Bar's Webex Personal Room: <https://uconn-cmr.webex.com/meet/tab13007> | 610489424 (for meetings by appointment).

Availability:

Email: Feel free to send me questions by email. I will usually respond within one day. If you did not get a response to an email by the end of the next day, feel free to resend your message. When sending me emails, please include the course number (Econ 1108) in the subject line.

Office Hours: Thursday 3:30-4:30 in person. Or, to meet in my personal WebEx room, please email me ahead.

If you need an appointment at a different time, please email me. Include Econ 1108 in the subject. Include a few options for times to meet so I can choose one, and briefly mention the reason for the meeting, for example; “help with homework”, or “a personally issue”.

Course Materials

You are not required to buy a textbook for this course.

Course readings and media will be made available within HuskyCT either as posted documents or, through either an Internet link or Library Resources.

I will not stay close to any text book, and you are not expected to buy one. However, if you would like to buy a book, one that I used in preparing some of the lectures is:

Games of Strategy, Fifth Edition by Avinash K. Dixit, Susan Skeath and David McAdams.

I will refer students to several chapters of the following (free online) books

Easley and Jon Kleinberg (a book on social networks with some game theory)

<http://www.cs.cornell.edu/home/kleinber/networks-book/>

Several other game theory books are available online for free. For example:

Bonnano

http://faculty.econ.ucdavis.edu/faculty/bonanno/GT_Book.html

Rubinstein

<http://gametheory.tau.ac.il/arielDocs/main.asp>

I also recommend the short videos by William Spaniel, Game Theory 101

<http://gametheory101.com/courses/game-theory-101/>

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My lectures, notes, handouts, assignments and displays are protected by state common law and federal copyright law. They are my own original expression and I've recorded them prior or during my lecture in order to ensure that I obtain copyright protection. Students are authorized to take notes in my class; however, this authorization extends only to making one set of notes for your own personal use and no other use. You may not record my lectures or any meetings with me. You may not copy a recording or any other material, provide copies of either to anyone else, or make a commercial use of them without prior permission from me. You may share notes with a student currently taking the class with you and missed class. The above applies for notes you receive from a classmate.

Course Description

This is an honors core course designed to engage you in interdisciplinary scholarship connected to real-world problems. Students are expected to show high levels of interaction and active learning, to engage in scholarly discussion with peers, challenge and be challenged.

This course offers an introduction to game theory. Game theory develops analytical tools to study strategic interactions between individuals, to better understand and predict behavior, conflicts and cooperation. Game theory is widely used in many disciplines (e.g., economics, psychology, political science, law, computer science, biology). The course introduces basic concepts and tools for solving games (e.g., simultaneous games and a Nash equilibrium, sequential games and subgame perfect equilibrium, asymmetric information models, repeated games) as well as a variety of applications (e.g., auctions, evolutionary biology and voting). Through simple examples, students can develop their ability to think strategically.

I took my first game theory course when I was an undergraduate student majoring in mathematics at the Hebrew University in Jerusalem. I enjoyed the weaving together of mathematical rigor and human behavior. Game theory brought me to Economics.

Course Objectives By the end of the semester, you should be able to:

- Recognize situations of strategic interactions
- Define and explain central concepts in Game theory
- Solve simple games, given the structure of the game and a solution concept (e.g. Nash Equilibrium).
- Provide strategic reasoning to explain or predict the behavior of agents engaged in simple strategic interactions.
- Find examples of applications of game theory to different disciplines

Course Outline: The following is a tentative plan and may be adjusted during the semester. For each topic, there will be a folder on HuskyCT with more detailed about readings, assignments and concepts covered.

1. Simultaneous games
 - a. Normal form games and pure strategy Nash Equilibrium
 - b. Zero sum games
 - c. Common knowledge and rationality
 - d. Mixed strategy Nash equilibria
2. Sequential games
3. Games with imperfect information and asymmetric information
4. Repeated games
5. Evolutionary games
6. Auctions
7. Social networks
8. Additional applications of game theory

Course Requirements and Grading

Summary of Course Grading:

Course Components	Weight
Graded Quizzes	30%
Problem sets and other homework assignments	20%
Class Participation	20%
Projects and peer reviews*	20%
Games	5%
Short presentation	5%

* The project is required for a passing grade even for students taking the course as pass/fail.

Quizzes. In class graded quizzes/tests. Four or more graded quizzes. I will drop your lowest graded quiz grade. The date and material included on each graded quiz will be announce at least one week before the quiz. If you miss one graded quiz, I will replace that grade with the average grade of the other quizzes. If you miss more than one graded quiz, you will need to take a make-up. The makeup date is the scheduled final exam date for this class. Collaboration is not permitted on graded quizzes.

Problem sets. Will be posted on HuskyCT. Each problem set will be accompanied by an online quiz. Students are encouraged to collaborate with other students on solving the problems, but should do the online quizzes or submit assignments themselves. Additionally, you might get other homework assignments which could include reading materials.

Participation: Active participation in class is expected. Students are expected to participate in class discussions, ask questions or provide answers to questions during class, work with groups on in class assignments, respond to live poles, make post on the discussion board when prompted, collect their graded work in class etc. For classes held online, I might use the chat to monitor participation. I encourage students to turn on their camera always and especially during group work, peer presentations and class discussions. One of the determinants of the participation grade is in-class “participation quizzes”. Participation quizzes are short in class assignments that will not be announced ahead.

Project: Students will explore and present an application of game theory to research in any discipline. Projects must have both a written and a presentation component. More details and due dates for different steps is provided in a separate document. **All students must contribute to the project. It is a minimum requirement for a passing grade for students taking the course as pass/fail.** Students will also be asked to discuss and peer review their peer's projects.

Games: There will be a number of in class or online games. Serious participation in games counts for 5% of the grade. Students can earn points for these games. Game points will affect your chance of winning a prize, but will not affect your course grade. Only serious participation in these games will count for the grade.

Short presentation: Each student will be assigned one date in the semester for a short (about 5 minutes) individual presentation in class. Students are expected to turn their camera on for their individual presentation. See details in a separate document.

Grading Scale:

The following grading scale captures the tentative letter grade associated with each course weighted grade. I reserve the right to deviate from this scale. Usually deviations if any are in favor of high grades. However, project participation and academic integrity are required for a passing grade.

Grade	Letter Grade	GPA
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
<60*	F	0.0

* An additional minimum requirement for a passing grade is contribution to the project, and adhering to the code of academic integrity.

Due Dates and Late Policy: All course due dates will be identified on HuskyCT. Deadlines are based on Eastern Time. I reserves the right to change dates as the semester progresses. All changes will be communicated in an appropriate manner.

You should complete all assignments on time. Doing so will be best for your learning, as you will be ready to ask questions, contribute to class discussions and benefit from reviewing solutions. It is understood that there might be special circumstances when you might be late with an assignment. As long as this happens infrequently, you will not be penalized for a late weekly assignment. But if this happens often, you might lose credit. If you are sick for an extended period of time and need accommodations, please inform the dean of students.

There is no final exam for this class. However, if you miss more than one graded quiz, you will need to take a makeup on the final exam date.

Short presentations should be on the date you are assigned. If you miss your presentation date, you will lose points. Short presentations should be posted on the discussion board up to one week after the presentation. If you post it late, you might lose points.

Due dates for the project and other course assignments will be announced during the semester. Late submissions of the project related assignments may result in a grade penalty.

Feedback and Grades:

I will try to grade tests within one week. Some of the grades will appear on HuskyCT, but some will only be included on the work you hand in, and in my own grades file. If you are in doubt or concerned about grades you can ask me.

Tips

I'm eager for my students to learn, benefit and enjoy this class and to succeed in it. Please do not hesitate to ask questions during class. You are also encouraged to take advantage of office hours and to ask questions by email. Ask your classmates for help, and offer help to others. Form study groups. Students are also welcome to schedule an appointment to discuss any personal issues that might affect their course work. I appreciate your willingness to raise issues that may stand in the way of your success in this course. I recommend:

- Regularly check HuskyCT announcements.
- Complete all course assignments on time.
- Regularly attend lectures. Review your lecture notes before the next lecture.
- If you miss class, make up materials with help of a peer and HuskyCT resources.
- Devote class time to class. Do not multitask.
- Get ready a few minutes before class.
- Be an active participants, ask questions, express opinions, and listen to others.
- Engage in the material in various ways. Experiment different learning styles.
- If you anticipate any difficulty satisfying any of the course expectations, please discuss these issues with me before add/drop period ends.
- Follow the code of Academic Integrity.
- Take care of yourself. Your wellbeing is important!

Additional information (adapted from UConn's sample syllabus)

Well-being. Success in college depends heavily on your personal health and well-being. Recognize that stress is an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. I strongly encourage you to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the semester, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance in your courses or campus life as soon as it occurs and before it becomes too overwhelming. In addition to your academic advisor, I strongly encourage you to contact the many other support services on campus that stand ready to assist you including:

Dean of Students Office <https://dos.uconn.edu/>

Academic Achievement Center <https://achieve.uconn.edu/>

Writing Center <https://writingcenter.uconn.edu/>

Quantitative learning center <https://qcenter.uconn.edu/>

Center for Students with Disabilities, <https://csd.uconn.edu/>

Title IX Office <https://titleix.uconn.edu/title-ix-at-uconn/about-title-ix-uconn/>

Student Health and Wellness -- Mental Health <https://counseling.uconn.edu/>

Husky Study Groups: Are you interested in forming a study group with other students in the class? There is a study group application in Nexus that can help you get started. For more information see https://nexus.uconn.edu/secure_per/studygroups/index.php I do not take part in coordinating or supporting use of this application.

Weekly Time Commitment: You should expect to dedicate to this course a minimum of six hours a week out of class in addition to the three hours of class time. This expectation is based on the various course activities, assignments, and assessments and the [University of Connecticut's policy regarding credit hours](#). (More information related to hours per week per credit can be accessed at the Online Student website at <https://onlinestudent.uconn.edu/learn-more/#collapsepanel-269-1-0-07>. Work load might not be even on all weeks. You will likely need more time preparing for exams, for your personal short presentation or working on the project.

Student Authentication and Verification

The University of Connecticut is required to verify the identity of students who participate in online courses and to establish that students who register in an online course are the same students who participate in and complete the course activities and assessments and receive academic credit. Verification and authentication of student identity in this course will include secure access to the learning management system using your unique UConn NetID and password. Additionally, I will check the StudentAdmin roster photographs at the beginning of the online teaching portion of the semester. Through monitoring of video chat, threaded discussions, and ongoing monitoring of multiple student submissions, I will be able to associate student work with individual students ensuring they are the same students receiving credit. As part of this effort, students might be asked to schedule individual live video meetings with me to explain or discuss answers to exam questions, or to answer questions about their final project. During such meeting the students might be asked to show a photo ID.

Resources for Students Experiencing Distress

The University of Connecticut is committed to supporting students in their mental health, their psychological and social well-being, and their connection to their academic experience and overall wellness. The university believes that academic, personal, and professional development can flourish only when each member of our community is assured equitable access to mental health services. The university aims to make access to mental health attainable while fostering a community reflecting equity and diversity and understands that good mental health may lead to personal and professional growth, greater self-awareness, increased social engagement, enhanced academic success, and campus and community involvement.

Students who feel they may benefit from speaking with a mental health professional can find support and resources through the [Student Health and Wellness-Mental Health](#) (SHaW-MH) office. Through SHaW-MH, students can make an appointment with a mental health professional and engage in confidential conversations or seek recommendations or referrals for any mental health or psychological concern.

Mental health services are included as part of the university's student health insurance plan and also partially funded through university fees. If you do not have UConn's student health insurance plan, most major insurance plans are also accepted. Students can visit the **Student Health and Wellness-Mental Health located in Storrs on the main campus in the Arjona Building, 4th Floor**, or contact the office at (860) 486-4705, or <https://studenthealth.uconn.edu/> for services or questions.

Accommodations for Illness or Extended Absences

Please stay home if you are feeling ill and please go home if you are in class and start to feel ill. If illness prevents you from attending class, it is your responsibility to notify me as soon as possible. You do not need to disclose the nature of your illness; however, you will need to work with me to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, students can email the Dean of Students at dos@uconn.edu to request support. Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

COVID-19 Specific Information: People with COVID-19 have had a wide range of symptoms reported – ranging from mild symptoms to severe illness. These symptoms may appear 2-14 days after exposure to the virus and can include: Fever, Cough, Shortness of breath or difficulty breathing, Chills, Repeated shaking with chills, Muscle pain, Headache, Sore throat, New loss of taste or smell

Additional information including what to do if you test positive or you are informed through contact tracing that you were in contact with someone who tested positive, and answers to other important questions can be found here: <https://studenthealth.uconn.edu/updates-events/coronavirus/>

Classroom/Virtual Classroom Guidelines

Students in this course are expected follow the code of Academic Integrity. “Academic misconduct is dishonest or unethical academic behavior that includes, but is not limited, to misrepresenting mastery in an academic area (e.g., cheating), intentionally or knowingly failing to properly credit information, research

or ideas to their rightful originators or representing such information, research or ideas as your own (e.g., plagiarism).”

In my course collaboration on weekly assignments is allowed and encouraged, but quizzes must be answered by the student independently. Absolutely no collaboration or outside help is permitted on exams. The university policy can be found in the [Responsibilities of Community Life: The Student Code](#). The policy also details the procedures the University uses to resolve academic misconduct cases. Students are responsible to become familiar with its provisions. Please also review [the library's Plagiarism Resources](#) .

Honor the uniqueness of your fellow classmates, and appreciate the opportunity we have to learn from each other. Please respect your fellow students' opinions and refrain from personal attacks or demeaning comments of any kind. Be polite and considerate. Students must treat everyone with respect.

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies and resources](#), which include:

- The Student Code
 - Academic Integrity
 - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or <http://csd.uconn.edu/>.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](#))

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

- Equipment Recommendations (<https://remotework.uconn.edu/equipment-recommendations/>)

- HuskyCT/Blackboard ([HuskyCT/ Blackboard Accessibility Statement](#), [HuskyCT/ Blackboard Privacy Policy](#))
- [Adobe Acrobat Reader](#) ([Adobe Reader Accessibility Statement](#), [Adobe Reader Privacy Policy](#))
- Google Apps ([Google Apps Accessibility](#), [Google for Education Privacy Policy](#))
- Microsoft Office (free to UConn students through uconn.onthehub.com) ([Microsoft Accessibility Statement](#), [Microsoft Privacy Statement](#))
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- WebCam

Privacy Statement: For information on managing your privacy at the University of Connecticut, visit the [University's Privacy page](#). NOTE: This course has NOT been designed for use with mobile devices.

Please note, that I intend to record lectures and that I might subsequently share these recordings with others.

Help

[Technical and Academic Help](#) provides a guide to technical and academic assistance.

This course uses the learning management platform, [HuskyCT](#). If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the [Help Center](#). You also have [24x7 Course Support](#) including access to live chat, phone, and support documents.

Student Technology Training

Student technology training is now available in a new HuskyCT short course created by students for students. It will prepare you to use the IT systems and services that you will use throughout your time at UConn, whether learning online or on-campus. It is available at https://lms.uconn.edu/ultra/courses/_80016_1/cl/outline.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.