



# Game Theory & Applications

ECO 4400

## Instructor Info —



Dr. Fatma B. Gunay



Office Hrs: F 1pm - 3pm



MAT313



fgunay@ufl.edu

## Course Info —



Jan 13 - April 23



Tuesday, Thursday



1:55pm - 3:40pm



MAT113

## TA Info —



Chenhui Lu (C.H.)



Office Hrs: Monday 4pm - 6pm



office



ch.lu@ufl.edu

## Overview

This course provides a detailed introduction to Game Theory and its applications. We will start with the basic concepts and insights of game-theoretic reasoning. The first week of the course is devoted to the introduction of the standard ways of representing games and to the discussion of the meaning of a strategy in different types of games. Once we cover the basics of game theory, we will dive deep into the applications of game theory to different fields. Games with imperfect information, repeated games, and mechanism design are more advanced topics we are going to cover. Some of the applications we will analyze (as time permits) are the Cuban missile crisis, insurance provision, contract design, price discrimination, and competition in oligopolies.

## Material

### Required Texts

Harrington, Joseph *Games, Strategies, and Decision Making*. 2nd Edition. Macmillan Learning.

Any required journal articles will be provided on Canvas.

## Lectures

ECO4400 Game Theory and Applications will be conducted in a face-to-face format and will take place in room MAT113. Additionally, recorded lectures from the previous academic year will be made available on YouTube. This dual approach aims to provide flexibility while ensuring access to course content. It is important to note that in-person attendance is mandatory and fundamental to the learning experience. Recorded lectures are supplementary and cannot substitute for the in-class interactions and discussions.

While in-person attendance is required for enriched engagement and interaction, we recognize that circumstances may arise requiring absences. In such cases, students with an excused absence will be granted access to course materials. It is the student's responsibility to communicate and justify the absence to the instructor prior to the absence occurrence.

## Exam Policies

The course will include three in-class exams. These exams are scheduled for the following dates:

- February 11
- March 25
- April 22

Each exam will encompass a range of assessment formats, including multiple-choice questions, short answer questions, and problems. It is important to note that the exams are not comprehensive; they will focus on the material covered since the previous exam.

To aid your preparation, a practice test will be provided before each exam. The practice test are designed to help you familiarize yourself with the assessment formats and types of questions that will be presented.

During the examinations, students are permitted to use a simple calculator (graphing calculators are not allowed). Additionally, you are allowed a 1-sided, hand-written, 3x5 cheat sheet to assist you during the exam.

Make-up exams will only be granted under exceptional circumstances, with approval from the instructor *prior to the exam date*. Valid reasons for requesting a make-up exam include substantiated academic conflicts, religious observances, or unforeseen emergencies. Such cases will be reviewed on an individual basis.

Exam papers will be graded within a week following the examination date. The results will be promptly announced on the Canvas, allowing you to receive timely feedback on your performance.

Your diligence and commitment to your studies are essential for success in this course. If you have any inquiries or require further clarifications regarding the assessment process, please do not hesitate to contact the instructor.

### Grading Scheme

60%	Exams, 20% each
25%	Homework Assignments
15%	Quizzes

Grades will follow the following scale. Curving is at the discretion of the professor.

Points	Grade
92.50 and above	A
90-92.49	A-
87.5-89.99	B+
82.5-87.49	B
80-82.49	B-
77.5-79.99	C
72.50-77.49	C-
70.00-72.49	D
0-69.99	E

### Assignments

Throughout the duration of the course, you will be assigned weekly assignments to be completed over the weekend. These assignments will be made available every Thursday at 7:00 PM on Canvas and are due for submission on the following Tuesday at 9:00 AM. It is imperative that you adhere to these due dates as outlined because late submissions will not be accepted.

Over the course of the module, you will complete a total of 13 assignments. At the conclusion of the term, the lowest grade among these assignments will be dropped, offering you the opportunity to alleviate any undue pressure resulting from potential setbacks.

## Quizzes

Throughout the semester, there will be weekly quizzes held either during the Tuesday or Thursday in-class sessions. These quizzes will exclusively cover the material discussed during the respective week's lectures. Attentive participation in lectures is sufficient to excel, as the quiz questions will directly reflect the lecture content. At the end of the semester, I am going to drop the lowest quiz grade among the 13 total quizzes administered. This accommodation provides a safety net in case of unforeseen challenges. Your quizzes will be evaluated by our Teaching Assistant, C.H., within one week of submission.

## Accommodations for Students with Disabilities

If you have a disability and need accommodations please be sure to contact the Disability Resource Center right away so they can help you get the accommodations you require. If you will need to use any accommodations in this class, please talk with me early so you can have the best possible experience this semester. For more specific information visit <https://disability.ufl.edu>

## Academic Integrity

The University of Florida maintains high standards for academic integrity in order to provide the students the best quality education. An online copy of the academic honor policy can be found at Student Honor Code. Students are expected to be familiar with the Code and to recognize that their work in the course is to be their own original work that truthfully represents the time and effort applied.

Maintaining the integrity of your academic work is of utmost importance in this course. It is imperative that you refrain from seeking external assistance, including the use of online tutoring websites. Please be aware that these platforms, which I will not name here, are known to collaborate with educational institutions by sharing user data.

I want to emphasize that you are expected to complete assignments and assessments independently, relying solely on your own understanding and efforts. If you encounter challenges or require clarification, I strongly encourage you to reach out to me for guidance. Upholding academic honesty not only reflects your commitment to your education but also contributes to a fair and equitable learning environment for all students.

I would like to remind you one more time that the Honor Pledge below applies to any course work you are assigned:

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. On all work submitted for credit by students at the university, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment.

## Generative Artificial Intelligence

The Department of Economics faculty assume that all work that is submitted for grading is written by the student whose name it bears, and that it represents their ideas and work. Accordingly, students are not permitted to use generative AI when completing assignments, quizzes, exams, or other graded work unless their instructor has expressly granted that permission. Unauthorized use of generative AI may constitute cheating and/or plagiarism. Such violations of the UF Student Honor Code will be reported to the UF Dean of Students Office and will be subject to severe sanctions.

## Use of Course Materials

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

## Health Counseling and Emergencies

### U Matter, We Care:

If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392-1575 so that a team member can reach out to the student.

### Counseling and Wellness Center:

<http://www.counseling.ufl.edu/cwc>, and 352-392-1575.

### Sexual Assault Recovery Services (SARS):

Student Health Care Center, 352-392-1161.

### University Police Department:

352-392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

## Diversity and Inclusion

I would like to create a learning environment for my students that supports different perspectives, thoughts, experiences, and identities. To help me accomplish this, please let me know if you have a name / set of pronouns that differ from the official UF records. If you believe that your performance in the classroom is being affected by outside factors, do not hesitate to contact me in person, electronically or even anonymously.

## Course Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [ufl.bluera.com/ufl/](http://ufl.bluera.com/ufl/). Summaries of course evaluation results are available online.

## Class Schedule

DATE	TOPICS	READINGS	ASSESSMENTS
Week 1 (1/13-1/19)	Introduction	Ch 1,2	HW1, Quiz1
	Game Fundamentals	Worksheet 1	
	Building a Game		
Week 2 (1/20-1/26)	Simultaneous Move Games	Ch 3,4	HW2, Quiz2
	Dominant / Dominated Strategies	Reading 1	
	Nash Equilibrium	Worksheet 2	
Week 3 (1/27-2/2)	Sequential Move Games;	Ch 8	HW3, Quiz3
	Subgame Perfect Nash Equilibrium	Worksheet 3	
Week 4 (2/3-2/9)	Nash Equilibria in Continuous Games	Ch 6	HW4, Quiz4
	Nash Equilibrium with Calculus	Worksheet 4	
2/11	EXAM I		
Week 6 (2/17-2/23)	Mixed Strategies	Ch 7	HW5, Quiz5
	Randomization and Mixed Strategies	Worksheet 4	
Week 7 (2/24-3/2)	Games with Imperfect Information	Ch 9	HW6, Quiz6
	SPNE revisited	Worksheet 5	
Week 8 (3/3-3/9)	Games with Private Information	Ch 10	HW7, Quiz7
	Bayesian Nash Equilibrium	Reading 3	
		Worksheet 6	
Week 9 (3/10-3/16)	Games with Private Information (Cont'd)	Ch 11	HW8 Quiz8
	Signalling		
Week 10	SPRING BREAK		
Week 11 (3/24-3/30)	Review		
3/25	EXAM 2		
Week 13 (3/31-4/6)	Cheap Talk Games	Ch 12	
Week 14 (4/7-4/13)	Repeated Games	Ch 14	
Week 15 (4/14-4/20)	Review		
4/22	EXAM 3		