

ECO 4400: Game Theory and Applications

Syllabus

Instructor: Luca Mantegazza
Office: MAT 329
Office Hours: W 10am-12pm (or by appointment)
Email: mantegazza@ufl.edu
Phone: 352-392-0117

Fall 2019
Course Time: T/R period 7-8
Course Location: MAT 16

Prerequisites: Principles in Microeconomics (ECO 2023 *or equivalent*) and Calculus I (MAC 2233 *or equivalent*)
[suggested only] Intermediate Microeconomics (ECO 3101 *or equivalent*)

Optional Texts: “Political Game Theory: an introduction” by N. McCarty and A. Meirowitz,
“An Introduction to Game Theory” by Martin J. Osborne,
“Game Theory: An introduction” by Steven Tadelis

COURSE DESCRIPTION

This course examines the main ideas and tools in the field of Game Theory and it is divided in to three main sections: foundations of non-cooperative game theory, non-cooperative game theory with uncertainty and behavioral economics, mechanism design and cooperative game-theory. The main goal of the course is for the student to understand the logic and the reasons behind the main topics explained in class and their applications to real life problems. For this reason, the focus of each lecture will be more on the understanding of each tool and idea and less on its mathematic description and discussion. However, this does not mean that mathematic applications will not be discussed in class or required to succeed in the tests.

COURSE REQUIREMENTS AND GRADING

1. Class presence and participation (5% of the final grade):

Attendance is highly correlated with better grades and thus strongly encouraged. You are required to be in class on time as a form of respect towards both the instructor and your classmates. I will take attendance at the start of each class but I will not use the Canvas system to automatically take off points for missed classes and late arrivals; at the end of the course I will weigh the number of absences and delays with participation in class to determine the contribution to the final grade. Timely and appropriate justification are encouraged and appreciated. If you have missed a class, it is your responsibility to find out relevant information from other students – therefore make sure you have the contact details of at least one other student in the class. In order to show respect for classmates and the instructors and to improve the learning experience for everybody, the use of cell phones, email, texting etc. is not tolerated. You can use your electronic devices only to take notes even though I strongly encourage you to use pen and notepad since during most classes we will study and analyze graphs, diagrams, and tables.

2. Three midterm tests (15% each, for a total of 45% of the final grade)

Each test will cover all the topics presented after the previous midterm, or the beginning of the course in the case of the first midterm, up to the last class before the midterm. The tests dates are: September 26, October 29, and December 3. Each midterm will last the two periods of the class on that day and will consist of a combination of short open answer questions, and mathematical and/or analytical exercises.

3. *Group project (50% of the final grade)*

The group project will analyze a real-world topic using the tools studied in class. Each project consists of four sections to be submitted at different dates during the semester: the first two sections relates to the topics in the first module of the course and the other two sections relates to the last two modules of the course. Since the first two sections cover easier topics, they are worth 10% each of the final grade, while the last two sections are worth 15% each of the final grade.

Each section is further divided into sub-parts: each group member will be responsible for specific sub-parts and the grade for each section of the project is calculated as the average of the grade of the parts the student was responsible for and the average grade of the section. This should encourage students to work together to improve the overall quality of the project while rewarding additional effort of individual students. Additional instructions will be provided during class and on Canvas.

During the classes dedicated to revision, I will randomly ask students to present their parts of the project to the class. This should help reviewing the material and also control that each student actually completed the assigned sub-parts. Ideally, each group will consist of four students, but the actual number will depend on the number of students taking the class. All works must be submitted exclusively as a PDF file by the deadline.

The deadlines for the different sections of the group project are: September 8 (Part1), September 22 (Part2), October 20 (Part 3), November 24 (Part 4).

GRADING POLICY AND SCALE

- Grades are calculated as follows: Attendance (5%), Midterm 1 (15%), Midterm 2 (15%), Group Project: Part 1 (10%), Group Project: Part 2 (10%), Group Project: Part 3 (15%), Group Project: Part 4 (15%).
- Make-up exams must be arranged before the exam date/time and will only be offered for UF-related conflicts and religious holidays.
- Unexcused absences from in-class exams results in a grade of 0.
- No Extensions No Substitute Work

91.00-100	A
89.00-90.99	A-
87.00-88.99	B+
78.00-86.99	B
76.00-77.99	B-
74.00-75.99	C+
61.00-73.99	C
59.00-60.99	C-
57.00-58.99	D+
51.00-56.99	D
50.00-50.99	D-
0-49.99	E

A grade of C- is not a qualifying grade for major, minor, Gen Ed, or College Basic distribution credit. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

---AND---

<http://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

UF POLICIES AND ASSISTANCE

Attendance:

Absences will be excused in accordance with UF policy. Acceptable excuses include illness, religious holidays, military obligation, & the 12-day rule. More info about attendance and make-up policies can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Academic Honesty:

The University places a high premium on academic honesty. Accordingly, severe penalties are imposed for plagiarism and other instances of deception or fraud. The university's policies regarding intellectual honesty are detailed in the Student Honor Code (see <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>).

Counseling:

If you are ever having general issues with your coursework in any course or trouble in your personal life, please seek help from myself or another faculty member. I also encourage you to utilize the FREE and ANONYMOUS services of the UF Counseling and Wellness Center (352-392-1575; <http://www.counseling.ufl.edu/cwc/>).

Disabilities:

Students with disabilities can request classroom accommodations. They should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) and then bring the provided accommodation letter to the instructor.

Online Course Evaluations:

Students' feedback on the quality of instruction is extremely useful to the instructor to improve the quality of the course, therefore I strongly encourage you to conduct the online evaluation at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu>.

CALENDAR

References' code:

- (1) "Political Game Theory: an introduction" by N. McCarty and A. Meiorowitz,
- (2) "An Introduction to Game Theory" by Martin J. Osborne,
- (3) "Game Theory: an Introduction" by Steven Tadelis

Lecture	Date	Topic	References		
			(1)	(2)	(3)
1	Aug 20	Syllabus + Choice theory under certainty	Ch.2	X	Ch.1
2	Aug 22	Description of the Group Project			
	Aug 26	<i>Deadline for the choice of the Group</i>			
<u>Non-cooperative Games: Foundations</u>					
3	Aug 27	Normal form games: theory and applications	Ch.5	Ch.2	Ch.3-5

4	Aug 29	Normal form games: theory and applications	Ch.5	Ch.2	Ch.3-5
5	Sep 3	Mixed Strategies in Normal form games	Ch.5	Ch.4	Ch.6
6	Sep 5	Max-minimization and zero-sum games	X	Ch.11	X
	Sep 8	<u>Deadline first part of the Group project</u>			
7	Sep 10	Extensive form Games: theory	Ch.7	Ch.5	Ch.7
8	Sep 12	Extensive form Games: applications	Ch.7	Ch.6	Ch.8
9	Sep 17	Repeated games: theory	Ch.9	Ch.15	Ch.10
10	Sep 19	Repeated games: applications	Ch.9	Ch.14	Ch.10
	Sep 22	<u>Deadline second part of the Group project</u>			
11	Sep 24	<i>Review before the midterm and group presentations</i>			
12	Sep 26	FIRST MIDTERM			
		<u>Non-cooperative Games: Uncertainty and Behavioral Economics</u>			
13	Oct 1	Choice theory under uncertainty	Ch.3	X	Ch.2
14	Oct 3	Bayesian Games: theory	Ch.6	Ch.9	Ch.12
15	Oct 8	Bayesian Games: applications	Ch.6	Ch.9	Ch.12
16	Oct 10	Extensive form games under uncertainty	Ch.8.1	Ch.10	Ch.15
17	Oct 15	Signaling games: theory	Ch.8.2	Ch.10	Ch. 16
18	Oct 17	Signaling games: applications	Ch.8.2	Ch.10	Ch. 18
	Oct 20	<u>Deadline third part of the Group project</u>			
19	Oct 22	Behavioral Economics: introduction	Readings provided in class		
20	Oct 24	<i>Review before the midterm and group presentations</i>			
21	Oct 29	SECOND MIDTERM			
		<u>Mechanism Design and Cooperative Games</u>			
22	Oct 31	Social Choice Theory	Ch.4	X	X
23	Nov 5	Mechanism Design	Ch.11	X	Ch.14
24	Nov 7	Mechanism Design	Ch.11	X	Ch.14
25	Nov 12	Mechanism Design	Ch.11	X	Ch.14
26	Nov 14	Coalitional Games: transferable payoffs	X	Ch.8	X
27	Nov 19	Coalitional Games: solution mechanisms	X	Ch.8	X
28	Nov 21	Coalitional Games: matching	X	Ch.8	X
	Nov 24	<u>Deadline fourth part of the Group project</u>			
29	Nov 26	<i>Review before the midterm and group presentations</i>			
30	Dec 3	THIRD MIDTERM			