ECO 4400: Game Theory and Applications
Syllabus

Instructor: Luca Mantegazza
Office: MAT 332
Office Hours: W 10:00am – 12:00pm (or by appointment)
Email: luca.mantegazza@imtlucca.it
Phone: 392-0117

Spring 2018
Course Time: T/R period 7-8
Course Location: MAT 14

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

Recommended Text: **"Political Game Theory: an introduction" by N. McCarty and A. Meirowitz**
Optional Texts: **"Introduction to Game Theory" by Martin J Osborne**
"Game Theory" by Michael Maschler, Eilon Solan, Shmuel Zamir

COURSE DESCRIPTION

This course examines the main ideas and tools in the field of Game Theory and it is divided in to two main sections: proper game theory (description of different types of games and solution techniques and their application to real life issues) and mechanism design (definition of rules and incentives in order to create a "mechanism" such that agents participating into it perform desired actions).

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 presented during tests: only that solving the "games" will be less important, for the sake of grading, than showing understanding for the theory behind them (i.e. if in a test the student provides the right solution to a "game" without explaining why and how s/he did it, s/he will receive a lower grade than a student providing the wrong numerical solution but explaining clearly the reasoning behind the use of the specific tool).

COURSE REQUIREMENTS AND GRADING

1. Class presence and participation (not directly affecting your final grade):

Attendance is highly correlated with better grades and thus strongly encouraged especially since numerous examples will be provided during classes on the whiteboard and PowerPoint slides will NOT be used for this class. 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 for personal records but I will NOT use them when assigning final grades. 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. IMPORTANT: during the course, there will be ten (10) "flash-tests" that will count for 30% of the final grade (3% for each test). If a student does not sit one of these tests s/he will score a zero on that test. Extra-sessions will be organized only for students that provide timely and reasonable justification (see below for the link to the UF policy on attendance).

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. ***Ten (10) flash tests (3% each, for a total of 30% of the final grade): see the calendar below for the exact dates***

Each flash-test will last between 30 and 45 minutes and consist of one or two short questions (to test the understanding of the theory) and one or two analytical problem type of questions with graphical and/or mathematical components (to test the understanding of the solution mechanisms). Each test will cover only the topics covered since the previous test (or the beginning of the course for the first set). More details will be given in due time.

3. ***Two midterm tests (20% each, for a total of 40% of the final grade)***

The first test will cover all the topics presented during the first half of the course and the second midterm will cover ONLY the topics covered in the second half. The tests dates are: March 13 and April 24. 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. More details will be given in due time.

4. ***Presentation of a two-part group project (20% for the project and 10% for the presentation, for a total of 30% of the final grade)***

The first part is the application of one or more of the tools analyzed in the first part of the course to a real-life topic, preferably in the field of economics, business, international relations, or politics. The second part is the design of a "mechanism" to solve a real-life problem using the tools studied in the second part of the course. During the presentation, I will ask question about both the theory behind and the actual applications of the tools. The grade will be determined by both the quality and originality of the work submitted and the performance of each student during the presentation. Since I will ask questions to each member of the group individually, the grade for the presentation could vary across group members, while the grade for the project will be the same for each member of the group.

IMPORTANT: the deadline to form the project groups (min. 3 – max. 4 people) is February 1, the deadline for the choice of the topic of the first part is March 1. The deadline to submit the final project is April 14 and the presentations will take place on April 17 and 19. Students are required to attend both days, first out of respect for their classmates' work and second because it is a good opportunity to review the main topics before the second midterm. Unjustified absence during presentation days will result in a penalty of 5 point on the final grade of the presentation.

The size of the group and the time allotted to each presentation will depend on the number of students taking the class.

GRADING POLICY AND SCALE

• Grades are calculated as follows: Ten (10) flash-tests (3% each for a total of 30%), Midterm 1 (20%), Midterm 2 (20%), Presentation (10%) and Group Project (20%).
• 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

After the first two weeks, the calendar has a regular pattern: "flash test" on Tuesday during the first period of class, introduction of a new topic in the second period on Tuesday, further analysis and examples on Thursday. The idea behind having tests on Tuesday is for the students to have more days to prepare for them. Midterms too are on Tuesdays for the same reason.

Lecture #	*Date*	*Topic*	*Readings*
1	Jan 9	Syllabus + Choice theory under certainty	Ch.2 (if needed)
2	Jan 11	Normal form games: theory and applications	Ch.5.1 - 5.2
3	Jan 16	Nash equilibria and solution mechanisms	Ch. 5.6 - 5.12
4	Jan 18	Constrained optimization and comparative statics	Ch.5.9 - 5.11
5	Jan 23	**FLASH TEST 1** Extensive form Games: theory	Ch.7.1 - 7.2 - 7.3
6	Jan 25	Extensive form Games: applications	
7	Jan 30	**FLASH TEST 2** Introduction to Choice Theory under uncertainty	Ch.3
8	Feb 1	**DEADLINE choice of groups for presentation** Mixed strategies in Normal Form Games	Ch.5.4 - 5.5
9	Feb 6	Bayesian Games: theory	Ch.6.1 - 6.8
10	Feb 8	Bayesian Games: applications	
11	Feb 13	**FLASH TEST 3** Extensive form games under uncertainty	Ch.8.1
12	Feb 15	Signaling games and applications	Ch.8.2
13	Feb 20	**FLASH TEST 4** Repeated games: theory	Ch.9.1 through Ch.9.5
14	Feb 22	Repeated games: applications	
15	Feb 27	**FLASH TEST 5** Introduction to Bargaining Theory	Ch.10 (selected parts)
16	Mar 1	**FLASH TEST 6 and DEADLINE choice first part of presentation** Review before first Midterm	
17	Mar 13	**First Midterm**	
18	Mar 15	Social Choice Theory	Ch.4

19	Mar 20	**FLASH TEST 7** Introduction to Mechanism Design	Ch.11.1 - 11.2
20	Mar 22	Incentive Compatibility and Individual Rationality	Ch.11.6
21	Mar 27	**FLASH TEST 8** Constrained Mechanism Design	Ch. 11.7
22	Mar 29	Mechanism Design and Signaling Games	Ch.11.8
23	Apr 3	Mechanism Design and Signaling Games	Ch.11.8
24	Apr 5	**FLASH TEST 9** Coalitional Games and the Core: theory	Readings provided in class
25	Apr 10	Coalitional Games and the Core: applications	Readings provided in class
26	Apr 12	**FLASH TEST 10** Review before the Second Midterm	
	Apr 14	**DEADLINE for Group Project**	
27	Apr 17	**Presentations**	
28	Apr 19	**Presentations**	
29	Apr 24	**Second Midterm**	

IMPORTANT: the textbook contains many sub-chapters with examples and applications of the different types of games and solution mechanisms. While there will not be time to cover all of them, I will select some of them depending on the pace of the class and the time available. Feel free to read these extra sections to gain a better understanding of the applications of game theory to real life issues.