ECO 5464
Game Theory and Industrial Organization
Syllabus

University of Florida

Fall 2023

Instructor: Germán Bet
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Course location: Room MAT 112
Course time: Mondays & Wednesdays 9:35AM-11:30AM (Periods 3 & 4)
Office: 340 Matherly Hall
Phone: (352) 392-1328
Office Hours: Mondays 11:30AM-1:30PM; and by appointment

TA: Anand Mathew
Email: anand.mathew@ufl.edu
TA Office Hours: Fridays 10:00AM-12:00PM

Course Description and Goals:

Noncooperative game theory is the analytic framework used to formally analyze strategic interaction, which occurs when each player's actions affect the other players' well-being, and relationships are of the rivalrous nature. The course combines theoretical models with some applications of game theory to industrial organization. Industrial

organization is the branch of Microeconomics that is concerned with the study of imperfect competition (i.e., functioning of markets with few competitors). The presence of a small number of competitors creates situations of strategic interactions among the market participants. The course will consider the analysis of game theoretic methods to study oligopolistic firm behavior in a variety of scenarios, ranging from simple forms of static competition to complex dynamic games involving strategic behavior. We will also study applications such as horizontal merger policy and merger evaluation, bargaining, or auctions.

Textbook and Readings:

There are no required textbooks for this course. Some recommended textbooks in Game Theory are:

- *Game Theory for Applied Economists*, by Robert Gibbons.
- *Games, Strategies, and Decision Making*, by Joseph E. Harrington, Jr.

A recommended textbook in Industrial Organization is Pepall, Richards and Norman, *Industrial Organization: Contemporary Theory and Applications*, 2014, Fifth Edition.

Course Communication

Announcements concerning the class will typically be made in class and through Canvas. You are responsible for all information made available through both of these avenues of communication.

Evaluation and Grading:

Evaluation will be based on problem sets (10% of the total grade), class participation (10%), and two midterm examinations. The first midterm examination (40% of the total grade) will be held in class on Wednesday October 18. The last exam (40% of the total grade) will be held the last day of class, on Wednesday December 6.

The course is divided into two parts, each followed by an exam that focuses mostly on the current part. Make-up exams will be administered only on those circumstances in which you cannot take an exam for a valid reason, such as illness or emergency (see

UF policy on this). **In that case, you should notify me prior to the start of the examination. A zero exam score will be assigned if you miss an exam for an unexcused reason.** Please also note that providing false documentation or creating an excuse to be excused from class that cannot be verified constitutes cheating under the University guidelines. UF policy on academic honesty will be strongly enforced.

There will be at least 6 problem sets. Due dates for the assignments will be announced in class (all times announced in class will be according to Eastern Standard Time). **All assignments are due on Canvas before the deadline on the due date. Late submissions will not be accepted and will receive zero credit**. As a general advice, make sure to submit your assignment at least several hours before the due date/time. In addition, after submitting your problem set through Canvas, make sure your submission is correct and contains all pages. If necessary, you will be able to replace your initial submission with an updated version before the deadline. You are responsible for verifying that any online assignment submission has properly been submitted through Canvas. Your lowest problem set grade will be dropped.

Class participation (i.e., asking and answering questions in class) accounts for 10% of the total grade. I will keep track of who comes to class and participates in class starting the second week of classes (once the roster is fixed). Requirements for class attendance and make-up exams are consistent with university policies (see UF policy here). Your class participation grade will be determined based on a curve.

Your final letter grade will be determined as follows:

$93 - 100$	A
$90 - 92.99$	$A-$
$87 - 89.99$	$B+$
$83 - 86.99$	B
$80 - 82.99$	$B-$
$77 - 79.99$	$C+$
$73 - 76.99$	C
$70 - 72.99$	$C-$
$67 - 69.99$	$D+$
$60 - 66.99$	D
$0 - 59.99$	E

Information on current UF grading policies for assigning grade points is available here.

Academic Honesty

You are expected to comply with the University of Florida's rules for academic honesty (which can be found here). Failure to comply with this commitment will result in disciplinary action.

Students with Disabilities

Students with disabilities requesting classroom accommodation must first register with the Disability Resource Center. The Disability Resource Center will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

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/. Summaries of course evaluation results are available to students here.

Topics

The following is a list of broad topics that we will be studying in this course. We will cover different applications of game theory to industrial organization within each of them.

1- Introduction to Game Theory

2- Static Games of Complete Information

- Normal-Form Representation of Games
- Dominant and Dominated Strategies
- Iterated Elimination of Strictly Dominated Strategies
- Nash Equilibrium in Pure and Mixed Strategies
- Applications: Hotelling Location Model, Oligopoly Models (Cournot Model, Bertrand Model with Homogeneous Products, Bertrand Model with Differentiated Products), Horizontal Merger Analysis.

3- Dynamic Games of Complete Information

- Extensive-Form Representation of Games
- Backwards Induction
- Subgame Perfect Nash Equilibrium
- Applications: Stackelberg Model of Duopoly, Collusion, Sequential Bargaining.

4- Games of Incomplete Information

- Job Signaling
- Cournot Competition under Asymmetric Information
- Auctions

Table 1: Course Schedule

Week	Topic
1	Syllabus & Introduction
2	Normal Form Representation of Games, Dominant and Dominated Strategies
3	Iterated Elimination of Strictly Dominated Strategies, Nash Equilibrium in Pure Strategies
4	Nash Equilibrium in Pure and Mixed Strategies; Assignment 1 due*
5	Applications of Static Games of Complete Information; Assignment 2 due*
6	Applications of Static Games of Complete Information
7	Applications of Static Games of Complete Information, Extensive-Form Representation of Dynamic Games; Assignment 3 due*
8	Extensive-Form Representation of Dynamic Games, Backward Induction
9	Exam Review & Midterm I
10	Subgame-Perfect Nash Equilibrium
11	Applications of Dynamic Games of Complete Information; ; Assignment 4 due*
12	Applications of Dynamic Games of Complete Information; Assignment 5 due*
13	Introduction to Games of Incomplete Information, Cournot Competition under Asymmetric Information; Assignment 6 due*
14	Job Signaling, Auctions
15	Auctions, Asymmetric Information
16	Exam Review & Midterm II

* Assignment due dates are tentative and subject to change depending upon class progress. Students will be informed of any changes made to the schedule.