

ECONOMICS 445
INDUSTRIAL ORGANIZATION
FALL 2021

Instructor:	Luca Maini (<i>he/him/his</i>)
Email:	lmaini@email.unc.edu
Office:	Gardner Hall 301
Office Hours:	Fr. 9–12pm, either in person or virtually (you must have an appointment: sign up here)
Class time & location:	TR 8:00–9:15am, Gardner Hall 307 (Section 001) TR 9:30–10:45am, Gardner Hall 307 (Section 002)
Midterm Exams	Midterm 1: Sept. 28th Midterm 2: Nov. 4th
Final Exam	Saturday, Dec. 4th, 8:00am (Section 001) Tuesday, Dec. 7th, 8:00m (Section 002)

Overview

Prerequisites: ECON 400 and 410; a grade of C or better in ECON 400 and 410 is required.

In this class we will study the causes and consequences of firms' strategic behavior, focusing on situations in which the assumptions behind perfect competition do not hold. Our main analytical tools will be microeconomic theory and game theory. We will supplement our theoretical work with empirical evidence from academic research and popular media.

The topics we will study include: pricing, product design, imperfect competition, collusion and cartels, firm-to-firm supply relationships, and mergers. Within each topic we will consider the impact of firms' actions on consumer welfare. We will also consider the motivation for and impact of US antitrust law on these settings.

Economics is more a way of thinking rather than a collection of facts, and industrial organization (IO) is no exception. Our main objective is to develop the ability to use economic models to understand a broad range of problems. These models, when constructed well, can be both simple and powerful. Your ability to construct, analyze, and interpret models is best developed through practice, and our class meetings, assignments, and exams will focus on providing this practice.

I will require you to use basic calculus during this course. If you remember what a derivative is and how to obtain one, you will not have any problems with the math that we use here.

Readings

There is no required textbook for this class. Your notes from class together with lecture slides will be sufficient to keep up with the course. However, if you would like to have an external reference, previous versions of this class used Introduction to Industrial Organization by Luis Cabral (2nd edition).

We will often supplement class notes with readings collected from popular media (newspapers, magazines, etc.). When assigned, these readings are **mandatory**. They will be accompanied by short online quizzes (to be completed before class) that will test your understanding of readings. I will use Sakai to distribute notes, readings, homework assignments, etc. I will use Gradescope to collect answers to all assignments (other than exams). Please verify that you can log on to the course pages on both these websites.

I also encourage you to keep up with current economics-related events. Good popular press sources for economic content include the Economist, and the Wall Street Journal, but you can find plenty of economic content on virtually any newspaper. There are also many online news sources and podcasts that are worth checking out: Planet Money, Freakonomics, FiveThirtyEight, and many more. While not all of these resources focus on IO, they are likely to provide interesting opportunities to think about the economic forces common to IO and other microeconomics areas.

Grading

Your grade will be based on (i) three exams, (ii) homework assignments, and (iii) participation, using the following breakdown:

Midterm 1	15%
Midterm 2	20%
Final Exam	40%
Problem Sets (5x) + Online Quizzes (~9x)	15%
Class participation	10%

- Exams will be closed books and notes, and cumulative: all material that has been covered in class up to that point is fair game.
- I will not reschedule exams other than for University Approved Absences (also refer to the Attendance policy section)
- I will post problem sets on Gradescope at least one week before they are due. Grades are based on completion. You will receive full credit (3 points) for (honestly) attempting to solve each problem. Partially completed problem sets will receive a score of 2 (mostly complete), or 1 (mostly missing). Collaboration (in groups of at most four students) is encouraged, as long as you indicate on you submit your own writeup and indicate who you collaborated with.
- Quizzes will test your understanding of assigned readings. I will post quizzes on Gradescope at least two days before they are due. They will be scored similarly to problem sets, but since they are much shorter, the only possible scores are 0 or 1.

- I will post detailed solutions for each problem set on Sakai at the same time the assignment is due. As a consequence, **no late work will be accepted**. However, you will be allowed to drop your lowest problem set score (so you have the option not to turn in one of the problem sets).
- There are two ways to fulfill the class' participation requirement. Under **Option A** (which is the default) you agree to be called upon in class to answer questions about the content of what is being covered. I do not care if you give the right or wrong answer. If you would prefer not to be called upon in class, please send me an email **by end of day on August 25** to opt out (no explanation necessary). In this case, you can fulfill the participation requirement under **Option B** by finding and emailing me five articles from popular media (podcasts and videos are also acceptable). The articles should be relatively recent, and discuss topics that are pertinent to class material. In your email, you also need to include a short explanation for why you think the article is interesting, and how it fits with what we covered in class. You can do this at any time before the last day of class of the semester (November 30). Regardless of how you fulfill your participation grade I expect everyone to attend class whenever possible (see Attendance policy section below).

All course grades will be stored and displayed on the Sakai course page. It is your responsibility to insure that the grades on this course page are accurate. Re-grade requests must be provided within one week of receiving your score, and accompanied by a written explanation of why you think you deserve a higher score. When you submit an assignment for a re-grade, everything will be re-scored and your grade may go up or down.

At the end of the course, I will sum up all the scores into a numerical percent score (rounded to the nearest integer) using the breakdown above, and convert it to a letter grade using the distribution below:

Letter Grade	Lower Limit	Upper Limit
A	85	100
A-	80	84
B+	76	79
B	72	75
B-	68	71
C+	64	67
C	60	63
C-	50	59
D	40	49
F	0	39

Notice that this distribution probably appears more generous than that of most other courses. This is by design, as it allows students who do poorly on any individual exam to still end up with a good grade if they do well over the rest of the course. However, keep in mind that the exams I assign tend to be a bit longer and more complicated than you may be used to. In past years, the mean score in exams has fluctuated between 65 and 75 percent.

Policies and expectations

Attendance policy

Engagement in the course (demonstrated through attention, comments, questions, active listening, and participation in in-class activities) is expected and a part of the learning experience. While I understand that students may not be able to attend every class, students must likewise understand that an absence from class may result in missed information and, consequently, a lower grade.

Repeated absences will adversely affect your participation grade unless they fall under one of the three categories of University Approved Absences:

1. Authorized University activities
2. Disability/religious observance/pregnancy, as required by law and approved by Accessibility Resources and Service and/or the Equal Opportunity and Compliance Office (EOC)
3. Significant health condition and/or personal/family emergency as approved by the Office of the Dean of Students, Gender Violence Service Coordinators, and/or the Equal Opportunity and Compliance Office (EOC).

COVID policies

Mask use. All enrolled students are required to wear a mask covering mouth and nose at all times in our classroom. This requirement is to protect our educational community—your classmates and me—as we learn together. If you choose not to wear a mask, or wear it improperly, I will ask you to leave immediately, and I will submit a report to the Office of Student Conduct. At that point you will be disenrolled from this course for the protection of our educational community. Students who have an authorized accommodation from Accessibility Resources and Service have an exception. For additional information, see Carolina Together.

Accommodations for extended absences. I will try my best to accommodate situations where students might miss extended time. The current plan is to try to run the class as a stripped down version of a “hybrid” course. All in-person lectures will also take place on Zoom and recorded to be made available on the cloud (you can find the zoom link on Sakai). Also note that **virtual lectures are not a substitute for in person attendance**. Attendance online will only be allowed for students who have University Approved Absences (see Attendance policy section). Moreover, students who attend virtually will not be able to interact with me during class (videos will be off, microphones will be muted, and I will not monitor the chat).

Honor code

You are expected to be honest and honorable in your fulfillment of course conduct, course assignments, and course exams. You are encouraged to work together with other students on the homework. However, each student must write up his or her own version of the homework assignment. Exams are taken individually, without any help from other students or unapproved resources. Adherence to the guidelines of the UNC honor code is required. In particular, students are expected to refrain from “lying, cheating, or stealing” in the academic context. If you are unsure about which actions violate that honor code, please see me or consult honor.unc.edu.

Accessibility Resources and Services

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: <https://ars.unc.edu> or email ars@unc.edu.

Counseling and Psychological Services

If you or anyone you know is struggling with mental health, I encourage you to seek counseling. CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: <https://caps.unc.edu/> or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more. (source: Student Safety and Wellness Proposal for EPC, Sep 2018). As a prize for reading to the end of the syllabus I will add 0.5 points to the overall course score of the first five students who email me the title of their favorite book or movie.

Title IX Resources

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at <https://eoc.unc.edu/report-an-incident/>. Please contact the University's Title IX Coordinator (Elizabeth Hall, interim – titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at <https://safe.unc.edu>.

Syllabus changes

I reserve the right to make changes to the syllabus, including assignment due dates and test dates. These changes will be announced as early as possible.

Course Outline

Below is a tentative schedule for the semester. Exact dates for topics and assignments may change. If that's the case I will try to give as much advance notice as possible.

Date	Topic	Assignments
PART 1: INTRODUCTION AND CONCEPTUAL FOUNDATIONS		
Aug. 19	Course objectives and introduction	
Aug. 24	Demand, production, and cost functions	Quiz 1 assigned
Aug. 26	Perfect competition & Monopoly	PS1 assigned, Quiz 1 due
Aug. 31	Price Discrimination I: 3DPD (linear)	Quiz 2 assigned
PART 2: PRICE DISCRIMINATION		
Sep. 2	Price Discrimination II: 1DPD (nonlinear)	Quiz 2 due
Sep. 7	Price Discrimination IIIa: 2DPD (nonlinear)	PS1 due
Sep. 9	Price Discrimination IIIb: 2DPD (nonlinear)	PS2 & Quiz 3 assigned
Sep. 14	Bundling	Quiz 3 due
PART 2: STATIC OLIGOPOLY THEORY		
Sep. 16	Game Theory I: Simultaneous-move games	Quiz 4 assigned
Sep. 21	Game Theory II: Sequential games	Quiz 4 due
Sep. 23	<i>Review</i>	PS2 due
Sep. 28	*** MIDTERM I ***	
Sep. 30	Competition w/ homog. products I: basic Cournot	
Oct. 5	Competition w/ homog. products II: Cournot variations	PS3 assigned
Oct. 7	Competition w/ homog. products III: Stackelberg	Quiz 5 assigned
Oct. 12	*** UNIVERSITY DAY ***	
Oct. 14	Competition with homogeneous products IV: Bertrand	PS3 & Quiz 5 due
PART 4: DYNAMIC OLIGOPOLY THEORY		
Oct. 19	Competition w/ diff. products I: Hotelling I	PS4 & Quiz 6 assigned
Oct. 21	*** FALL BREAK ***	
Oct. 26	Competition w/ diff. products I: Hotelling II	Quiz 7 assigned, Quiz 6 due
Oct. 28	Market Structure and Outcomes	Quiz 7 due
Nov. 2	<i>Review</i>	PS4 due
Nov. 4	*** MIDTERM II ***	
Nov. 9	Game Theory III: Repeated Games	Quiz 8 assigned
Nov. 11	Collusion I	PS5 assigned, Quiz 8 due
Nov. 16	Horizontal Mergers	Quiz 9 assigned
Nov. 18	Vertical Relationships	Quiz 9 due
Nov. 23	Misc. Topics	PS5 due
Nov. 25	*** THANKSGIVING BREAK ***	
Nov. 30	<i>Review</i>	