

ECONOMICS 445  
INDUSTRIAL ORGANIZATION  
SUMMER I 2024

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Office: Gardner Hall 417  
Office Hours: By appointment only

Class time & location: MoTuWeThFr 11:30 am - 1:00 pm Gardner Hall 007  
May 15, 2024 - Jun 22, 2024

Midterm Exams Midterm 1: May 24  
Midterm 2: June 7

Final Exam Friday, June 21 or Saturday, June 22 (TBA)

## 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).

## Grading

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

Midterm 1	25%
Midterm 2	25%
Final Exam	40%
Problem Sets (5x)	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.
- I will post detailed solutions for each problem set on Canvas 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).

All course grades will be stored and displayed on the Canvas 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

## **Policies and expectations**

### **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.

### **Attendance policy**

University Policy: As stated in the University's Class Attendance Policy, no right or privilege exists that permits a student to be absent from any class meetings, except for these 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).

### **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](http://honor.unc.edu).

### **Acceptable Use Policy**

By attending the University of North Carolina at Chapel Hill, you agree to abide by the University of North Carolina at Chapel Hill policies related to the acceptable use of IT systems and services.

The Acceptable Use Policy (AUP) sets the expectation that you will use the University's technology resources responsibly, consistent with the University's mission. In the context of a class, it's quite likely you will participate in online activities that could include personal information about you or your peers, and the AUP addresses your obligations to protect the privacy of class participants. In addition, the AUP addresses matters of others' intellectual property, including copyright. These are only a couple of typical examples, so you should consult the full Information Technology Acceptable Use Policy, which covers topics related to using digital resources, such as privacy, confidentiality and intellectual property. Additionally, consult the Safe Computing at UNC website for information about data security policies, updates, and tips on keeping your identity, information, and devices safe.

### **Accessibility Resources & Services (ARS)**

Accessibility Resources and Service (ARS – [ars@unc.edu](mailto:ars@unc.edu)) receives requests for accommodations, and through the Student and Applicant Accommodations Policy determines eligibility and identifies reasonable accommodations for students with disabilities and/or chronic medical conditions to mitigate or remove the barriers experienced in accessing University courses, programs and activities. ARS also offers its Testing Center resources to students and instructors to facilitate the implementation of testing accommodations.

### **Counseling & Psychological Services (CAPS)**

UNC-Chapel Hill is strongly committed to addressing the mental health needs of a diverse student body. The Heels Care Network website is a place to access the many mental health resources at Carolina. CAPS is the primary mental health provider for students, offering timely access to consultation and connection to clinically appropriate services. Go to their website <https://caps.unc.edu/> or visit their facilities on the third floor of the Campus Health building for an initial evaluation to learn more. Students can also call CAPS 24/7 at 919-966-3658 for immediate assistance.

### **Data Security & Privacy**

UNC-Chapel Hill is committed to fulfilling its responsibilities of transparency as a state-sponsored institution of higher learning, protecting certain types of information, and using information Carolina collects only for appropriate purposes. Consult the UNC-Chapel Hill Privacy Statement for additional information.

### **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/> or by contacting the University's Title IX Coordinator (Elizabeth Hall, [titleixcoordinator@unc.edu](mailto:titleixcoordinator@unc.edu)) or the Report and Response Coordinators in the Equal Opportunity and Compliance Office ([reportandresponse@unc.edu](mailto:reportandresponse@unc.edu)). Confidential resources include Counseling and Psychological Services and the Gender Violence Services Coordinators ([gvsc@unc.edu](mailto:gvsc@unc.edu)). Additional resources are available at [safe.unc.edu](http://safe.unc.edu).

## **Policy on Non-Discrimination**

The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals' abilities and qualifications. Consistent with this principle and applicable laws, the University's Policy Statement on Non-Discrimination offers access to its educational programs and activities as well as employment terms and conditions without respect to race, color, gender, national origin, age, religion, genetic information, disability, veteran's status, sexual orientation, gender identity or gender expression. Such a policy ensures that only relevant factors are considered, and that equitable and consistent standards of conduct and performance are applied. If you are experiencing harassment or discrimination, you can seek assistance and file a report through the Report and Response Coordinators (email [reportandresponse@unc.edu](mailto:reportandresponse@unc.edu) or see additional contact info at [safe.unc.edu](http://safe.unc.edu)) or the Equal Opportunity and Compliance Office at <https://eoc.unc.edu/report-an-incident/>.

## **Diversity Statement**

I value the perspectives of individuals from all backgrounds reflecting the diversity of our students. I broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. I strive to make this classroom an inclusive space for all students. Please let me know if there is anything I can do to improve. I appreciate any suggestions.

## **Artificial Intelligence (AI) Use Policy**

The following uses of generative AI tools are permitted in this course: Categories of possible permitted use include, but are not limited to: topic selection, brainstorming and idea generation, research, source validation, outlining and planning, drafting, media creation, peer review, revising, and polishing.

## Course Outline

Below is a **tentative** schedule for the semester. Exact dates for topics and assignments may change.

<b>Date</b>	<b>Topic</b>	<b>Assignments</b>
<b>PART 1: INTRODUCTION AND CONCEPTUAL FOUNDATIONS</b>		
	Course objectives and introduction Demand, production, and cost functions Perfect competition & Monopoly Price Discrimination I: 3DPD (linear)	<b>PS1</b>
<b>PART 2: PRICE DISCRIMINATION</b>		
	Price Discrimination II: 1DPD (nonlinear) Price Discrimination IIIa: 2DPD (nonlinear) Price Discrimination IIIb: 2DPD (nonlinear) Bundling	<b>PS2</b>
<b>PART 3: STATIC OLIGOPOLY THEORY</b>		
	Game Theory I: Simultaneous-move games Game Theory II: Sequential games <b>*** MIDTERM I ***</b> Competition w/ homog. products I: basic Cournot Competition w/ homog. products II: Cournot variations Competition w/ homog. products III: Stackelberg Competition w/ homog. products IV: Bertrand	<b>PS3</b>
<b>PART 4: DYNAMIC OLIGOPOLY THEORY</b>		
	Competition w/ diff. products I: Hotelling I Competition w/ diff. products I: Hotelling II <b>*** MIDTERM II ***</b> Market Structure and Outcomes Game Theory III: Repeated Games Collusion I Horizontal Mergers Vertical Relationships <b>***FINAL***</b>	<b>PS4</b>  <b>PS5</b>