

Econ 4490: The Digital Economy

University of Pennsylvania, Spring 2025

Course Syllabus

Instructor:	Juan Camilo Castillo	Time:	Tue & Thu 10:15 – 11:45 am
Email:	Canvas inbox	Location:	TOWN 303

Office hours

Thursdays 3:30-5:30 pm
PCPSE 629

Course description This is an advanced undergraduate course on the digital economy. Our two main goals are (a) to understand how people and companies interact in digital markets and (b) to understand how digital markets should be designed and regulated. The course uses a combination of theoretical modeling and empirical evidence in order to achieve those goals. We analyze some key features that are prevalent in digital markets, including price discrimination, network effects, two-sided markets, search and matching, reputation systems, and the use of data. We also zoom in on individual markets, such as e-commerce, media platforms, and the gig economy.

Prerequisites Econ 101 (Intermediate Microeconomics), Econ 104 (Introduction to Econometrics), Math 114 or 115 (Calculus, Part II)

Class structure The class and exams will take place in person. Canvas will be used as the main form of communication for the class as well as for problem sets.

Communication All communication will take place on [Canvas](#), where all course materials will be posted. All class announcements will be made through Canvas. If you have questions about content or logistics, you should ask them on Ed Discussion (you can post anonymously, but I will be able to see your name). I will monitor Ed Discussion forums, but I expect fellow students to be active answering questions. If you have a question about a sensitive matter or something you prefer not to make public, you are welcome to reach out directly to me using the Canvas inbox. *I will not answer if you write to me by email.*

I will stop answering substantive questions (as opposed to questions about logistics) about assignments *24 hours before the assignment is due*, and I will stop answering substantive questions about exams *24 hours before the exam*. The only exception will be clarifying mistakes or ambiguities in the description of assignment question or exam logistics.

Readings There will be no course textbook. The class will follow a variety of readings, including papers, newspaper articles, and book chapters. Students are expected to do the readings before the class. Reading content will be tested on exams. A reading list will be posted on Canvas and will be updated as the semester goes by. The list of readings for every lecture will be updated at least one week prior to the lecture.

Grading policy There will be three midterm exams, each one of which will determine 18% of the final grade. There will also be three problem sets, each one of which will determine 12% of the final grade. Participation will determine the remaining 10% of the grade.

Regrading You may submit a regrade request by sending a Canvas inbox message to the instructor. The regrade request (a) must clearly state the specific item in dispute and contain a clear and persuasive explanation of the reason for your regrade request, and (b) must be submitted within one week (seven days) from the initial return of the problem set or exam. If your regrade request is accepted, the instructor will then regrade the entire problem set or exam, not just the item in question.

Problem sets Assignments will be posted on Canvas at least three weeks before the due date. They must be submitted through Canvas before the beginning of the class (at 10:15 am). Late assignments will not be accepted. You should upload a scanned version of your writeup; you are responsible for ensuring your answers are legible. You are encouraged to consult with your classmates as you work on the problem sets. However, make sure that you work through problems yourself and ensure that any answers you submit for evaluation are the result of your own effort. Each student must submit individual write-ups of their problem set. In addition, you must list the names of students with whom you have collaborated.

Midterms Midterms will take place in person. They are closed book exams, and they are designed so you can do them in 80 minutes. If you miss one midterm because of one of the valid excuses according to the [Economics Department course policies](#), each one of the other two midterms will count for 27% of your grade.

Participation Participation is an integral part of this course. You are expected to attend lectures, but that is not all that is expected from you. You should also participate actively, which can take different forms, especially asking and answering questions both during class and on Ed Discussion.

Class material The material from the class (slides, midterms, and assignments, among others) is not to be shared with anyone outside the class. In particular, you are not allowed to upload any material to any note sharing website like Course Hero.

Accommodations If you require any accommodations for exam taking, it is your responsibility to talk to the instructor at least two weeks prior to the exam. If you need to make arrangements with the Weingarten Center, it is your responsibility to ensure everything is set up properly by the time of the exam. You must reach out to them well in advance (following their policy) to ensure they can satisfy your required accommodations.

Course outline

PRELIMINARIES

1. Introduction (1 lecture)

PART 1: MARKET STRUCTURE AND PRICING

2. IO summary (2 lectures)
3. Pricing and competition (4 lectures)
 - (a) Pricing of information goods
 - (b) Price discrimination and bundling
4. Platforms and network effects (4 lectures)
 - (a) Network effects
 - (b) Two-sided platforms

PART 2: TOOLS AND MARKET DESIGN

5. Data (4 lectures)
 - (a) Prediction vs. causality
 - (b) Machine learning and A/B testing
 - (c) Privacy
6. Search and matching (1 lecture)
7. Reputation and ratings (1 lecture)
8. Auctions (1 lecture)

PART 3: INDIVIDUAL MARKETS

9. Advertising (1 lecture)
10. E-commerce (1 lecture)
11. Media (1 lecture)
12. The sharing/gig economy (2 lectures)
 - (a) Ride-hailing
 - (b) Labor markets
 - (c) Lodging
13. Generative AI (1 lecture)
14. Blockchain and cryptocurrencies (1 lecture)

Course schedule

Date	Lecture (Tuesday)	Date	Lecture (Thursday)
		Jan 16	1. Introduction
Jan 21	2. IO Summary 1	Jan 23	3. IO Summary 2
Jan 28	4. Pricing and competition 1	Jan 30	5. Pricing and competition 2
Feb 4	6. Pricing and competition 3	Feb 6	7. Pricing and competition 4
Feb 11	8. Plat. and net. effects 1 – Pset 1	Feb 13	9. Platforms and network effects 2
Feb 18	Midterm 1	Feb 20	10. Platforms and network effects 3
Feb 25	11. Platforms and network effects 4	Feb 27	12. Antitrust in digital markets
Mar 4	13. Data 1	Mar 6	14. Data 2
Mar 11	<i>Spring break</i>	Mar 13	<i>Spring break</i>
Mar 18	15. Data 3 – Pset 2	Mar 20	16. Data 4
Mar 25	Midterm 2	Mar 27	17. Search and Matching
Apr 1	18. Reputation and Ratings	Apr 3	19. Auctions
Apr 8	20. Advertising	Apr 10	21. E-commerce
Apr 15	22. Media	Apr 17	23. Sharing/gig economy
Apr 22	24. Blockchain and crypto – Pset 3	Apr 24	25. Generative AI
Apr 29	Midterm 3		

Departmental course policies All Economics Department course policies apply even if they are not explicitly listed here. [Click this link](#) to view full details.