This is an advanced undergraduate course studying firm decision-making, with a focus on the role of information in markets and the technology and e-commerce sectors. We will explore how information enhances the scope for trade, including how firms collect and aggregate information about consumers’ preferences to price discriminate and tailor product recommendations, how designing rating systems that facilitate communication between consumers can overcome moral hazard and improve trade, and how information affects firms’ abilities to compete and collude with each other. We will also discuss the unique features of information goods—for example, online content, music or data about consumer behavior—including how to produce, price and sell information. Material will be a combination of economic models and applications to specific firms or industries. The goal is to provide a solid theoretical base to rigorously analyze firms and industries, identify distinct features of technology and e-commerce industries, discuss real-world applications of these formal models, and develop your analytical skills.

The intersection of information and technology in markets is an exciting topic, and an active area of research within microeconomics. I hope that you will come to share my excitement for the novel questions and insights that arise in these settings.

Instructors.

Professor: Aislinn Bohren, abohren@sas.upenn.edu
TAs: Nawaaz Khalfan, khalfan@sas.upenn.edu; Kharis Sokolov, kharis@sas.upenn.edu

Important Dates.

• Midterm 1 due Thursday 10/8 at 3pm
• Midterm 2 due Thursday 11/19 at 3pm
• Thanksgiving: no discussion Thursday 11/26 or Q&A Friday 11/27
• Presentations Thursday 12/3 and Tuesday 12/8 from 1:30-3pm live on Zoom
• Final project due Monday 12/21 at 12pm

There will be no instructional material (i.e. recorded lecture, discussion session, Q&A) the weeks of the midterms or presentations.

Class Structure.

Each week will consist of a unit that includes synchronous and asynchronous components, as described below. A mix of required readings from academic journals, blogs, and the news and a problem set will accompany the instruction. All material will be posted on Canvas.

• Prerecorded Lecture: posted Tuesday
– Approximately 70 minutes, accompanied with lecture notes and slides.
– Will include conceptual questions and questions about readings to discuss on a Canvas discussion board for participation credit.
– No posted lecture 10/6 or 11/17 due to midterms or 12/1 or 12/8 due to presentations.

• **Discussion Session:** Thursday 1:30-2:30pm on Zoom
  – Session during which Professor Bohren solves problems, discusses articles, and does other interactive activities such as classroom games.
  – Will focus on material related to the recorded lecture.
  – Live participation strongly encouraged; will be recorded for students who are unable to attend.
  – No discussion session 10/8 or 11/19 due to midterms, 11/26 due to Thanksgiving or 12/3 due to presentations. Discussion on 10/22 moved to 2-3pm.

• **Q&A:** Friday 10-11am on Zoom (with Nawaaz)
  – Live session in which Nawaaz solves problems and answers questions.
  – Will focus on material related to the weekly lectures.
  – Submit your questions ahead of time on piazza or ask questions during the session.
  – Will be recorded for students who are unable to attend.
  – No sessions 10/9 or 11/20 due to course midterms, 11/27 due to Thanksgiving or 12/4 due to presentations.

• **Office Hours:** Zoom sessions during which we answer individual questions (not recorded)
  – Monday 11am-12pm and 3-4pm (Kharis)
  – Tuesday 9-10am (Nawaaz)
  – Thursday 2:30-4pm (Professor Bohren)
  – Friday 11am-12pm (Nawaaz)

**Assignments.**
Submit all assignments on Canvas.

**Problem Sets.** There will be a weekly problem set to accompany each unit. It will be posted on Tuesday and is due the following Tuesday at 1:30pm. These assignments will develop your problem solving skills and build the skills you need to succeed on the exams. The assignments can be discussed with classmates, but should be written and submitted individually. Answers will typically be posted to canvas the day the problem set is due. As a result, late problem sets will not be accepted.

• **Due:** 1:30pm Tuesday 9/8, 9/15, 9/22, 9/29, 10/20, 10/27, 11/3, 11/10, 12/1 (9 total; no problem sets the weeks of exams or last week)
• Your lowest score will be dropped.
Exams. There will be two take-home midterms. Both are open book, open notes, anything but the internet. You will have 48 hours to complete each exam. There is no final exam.

- **Midterm 1:** posted Tuesday 10/6 at 3pm and due Thursday 10/8 at 3pm
- **Midterm 2:** posted Tuesday 11/17 at 3pm and due Thursday 11/19 at 3pm

Final Project (in groups). A main requirement for the class is a case-study project. The paper portion of the project is due on Monday 12/21 at 12pm. A shorter proposal of what your plan for the project is due Friday 10/16 at 3pm. Students will present their projects during the last week of class. Details on what is expected for this project are provided in a separate handout.

- Group and Firm Selection: by Friday 9/18 at 3pm
- Proposal: due Friday 10/16 at 3pm
- Presentations: Thursday 12/3 and Tuesday 12/8 from 1:30-3pm on Zoom.
- Final Paper: due Monday 12/21 at 12pm

Participation. You will receive credit for participation, including on Canvas in response to the lecture prompts, on piazza in response to your classmates’ posts and during the discussion session.

Grade Breakdown.

- Problem Sets: 30%
- Midterms: 15% each
- Presentation: 10%
- Final Paper: 20%
- Participation: 10%

Other Details.

Correspondence. We will use piazza to facilitate communication with your classmates. Post all content-related questions about problem sets, projects and lecture on piazza. This is a great way to collaborate with classmates. Course instructors will monitor, and occasionally post, on the forum. Piazza will also help instructors to identify areas of difficulty or interest for students and hone lecture to focus on these areas.

piazza.com/upenn/fall2020/econ235

Use email for correspondence that is not appropriate for piazza. Emails will receive a response within 24 hours Monday through Friday. Include Econ 235 in the subject line.

Text. There is no required textbook for the class. The optional textbook is:

Prerequisites Econ 101; Math 104 & 114 or Math 115. Econ 103 is recommended. Econ 235 assumes that students have taken multivariate calculus and have basic knowledge of probability. A strong understanding of these mathematical tools is crucial to succeed in the course.

Course Policies & Support. The Economics Departmental Course Policies outline rules about missed assignments, grading appeals, academic integrity, etc. You are responsible for familiarizing yourself with these policies.

If anything arises that impacts your ability to complete an assignment or participate in the course, please reach out to me. The course is designed to be flexible and we can work together to figure out a path forward. If you are feeling overwhelmed or having difficulty coping at any point, Penn has resources available to help you. CAPS is providing virtual counseling (https://caps.wellness.upenn.edu/).

Outline of Topics.

Below is a brief overview of the main topics that we will cover in the course. A detailed schedule of the topic for each week will be posted on the Canvas homepage and updated throughout the semester.

1. **Market Structure:** an overview of market structure and market power, including monopoly, monopsony and Antitrust Law.

2. **Internet Markets and Information Goods:** how information as a good differs from standard consumer goods, new issues that arise for internet firms, the Long Tail Theory of Demand, utilizing the vast troves of data generated by online consumers.

3. **Pricing in Online Markets:** using consumer data to price discriminate, peak-load pricing, experience goods, product differentiation as a means of price discrimination, dynamic pricing.

4. **Switching Costs and Lock-in:** creating barriers to switching products, bargaining to acquire new customers.

5. **Advertising:** providing information to consumers to expand reach or increase value, branding and persuasive advertising.

6. **Reputation and Ratings Systems:** reputation as a means to overcome moral hazard by providing incentives for high effort or adverse selection by providing information about quality, key features of online rating systems, the value of a good reputation.

7. **Collusion and Cartels:** oligopoly models (Bertrand, Cournot); how firms can collude to set higher prices.