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Harvard University  
Department of Economics  
Spring 2020

**Econ 1642: Advanced Industrial Organization  
Syllabus**

**Tuesday 12:00 PM - 02:45 PM  
Sever 206**

**Course Description:**

This course studies firms, markets and competition. We will study the theory of industrial organization, focusing on analyzing the way firms make decisions, as well as the impact of those decisions on market outcomes such as market prices, quantities, the type of products offered and social welfare. The fundamental questions addressed in this course include: Why are markets organized the way they are? How does market organization affect firm behavior, such as firm production or pricing? How does the behavior of firms in turn affect the market structure, such as the number of firms or the range of products offered? We will use formal models in order to address these questions. The goals of the course include the development of intuition for firm strategic behavior, such as pricing, as well as the development of skills for the analysis of formal models and their empirical evaluation. The textbook will provide background and introduction to a variety of topics, many of which will be covered in class in greater depth. Lectures (along with problem sets) will be the core of the course.

**Note:** Ec 1640 and Ec 1642 may not both be taken for credit.

**Course Website:** <https://canvas.harvard.edu/courses/65012>

**Prerequisites:** Microeconomics (Ec1010a or 1011a), multivariable calculus (differentiation), and basic (introductory) probability and statistics.

**TF and Office hours:**

There is one TF for the course: Audrey Tiew [audreytiew@g.harvard.edu](mailto:audreytiew@g.harvard.edu)

She will hold office hours (by appointment), and occasional sections and review sessions. I will hold office hours on in Littauer 119 by appointment (request by email).

**Textbook and References:** The course will primarily rely on materials that are covered in lecture. Slides will be used and posted on the course website.

There is a textbook that supplements the materials in the course:

- Luis Cabral, Introduction to Industrial Organization, 2ed (MIT Press)

This is available for purchase online and at the Harvard Coop. The book is recommended, and problem sets will reference certain problems contained in the text. There is a list of suggested practice problems from Cabral that will be posted on the course website.

Other potential references and materials will be posted on the course website.

For those seeking additional reading, the following are optional (and some are more challenging than others):

- Oz Shy, Industrial Organization: Theory and Applications, MIT Press 1995. [primarily theoretical undergraduate reference]
- Robert Gibbons, A Primer in Game Theory, Prentice Hall, 1992. [game theoretic concepts often employed in IO]
- Jean Tirole, The Theory of Industrial Organization (Second Edition), MIT Press, 2000. [classic graduate reference to core theoretical IO]

### **Expectations (Grading and Deliverables)**

Grading in the class will be determined as follows:

**1. Problem Sets** (20%): There will be 4 problem sets due during the semester, and will be posted on the course website.

- Everyone must write up and submit their own problem set; explicitly copying (electronically or otherwise) other's work is not permissible. As you may discuss and exchange ideas with your classmates, you must make sure that you can work through the problem yourself and that any answers you submit for evaluation are the result of your own efforts. You should list the names of students with whom you have collaborated on problem sets and limit this to at most three others.
- Problem sets are due at the beginning of class of indicated days (by 12:15p). If you believe you will be late or absent, anticipate absence by scanning and emailing the problem set to the TF before the deadline.

**2. Class Participation** (10%): You are strongly encouraged to be engaged and a good citizen during class. Class participation is expected.

**3. Exams** (70%): Please ensure that you will be available on the exam dates.

If you perform better on the final than the midterm, the final will be weighted by more.

(a) Midterm Exam (25 / 15%): Held in class on March 10.

(b) Final Exam (45 / 55%): The final is cumulative and held during exam period.

Exams are closed book; you will be able to use a scientific calculator (no phones).

**Academic Integrity:** Students are advised to familiarize themselves with the Harvard College Honor Code (<http://honor.fas.harvard.edu/>).

### **Course outline:**

This is an advanced undergraduate course exploring how firms behave in markets in which they have market power. We will begin by studying monopoly behavior and, in particular, ways monopolists try to maximize the amount of profits they can extract. We will study models of the importance of commitment for a monopolist selling a durable good, of price discrimination and product bundling, and of product quality choice when consumers are not perfectly informed. We will then study pricing behavior in oligopoly markets. In oligopoly the payoff of a firm depends not only on its own decisions but also directly on those taken by their rivals. To analyze oligopoly pricing we will review and make use of game theory. We will consider static models of oligopoly interaction, as well as dynamic models in which firms interact repeatedly raising the possibility that they can sustain collusive prices above the prices that would prevail if they competed. Then, we will study

strategic decisions firms take over instruments other than price that aim at the creation and exploitation of market power. These include decisions over whether or not to enter a market, to what extent to differentiate products from competitors, how much to advertise, and measures to deter entry of rivals.

What follows is an outline of the topics to be covered. Some material will spill-over to the next lecture (depending on pace and interest), so dates of when materials are covered are subject to change (with the exception of exam dates and problem set deadlines). Textbook references are optional and for your reference (not everything in the textbook will be covered or required).

1. **January 28.** Practical information. Introduction on industrial organization. Lecture 1: Firm Behavior and perfect competition – Textbook chapters 1, 3.1, 3.2.
2. **February 4.** Lecture 2: Market power: the monopoly case. Demand elasticity. Multiproduct monopoly. Lecture 3: Durable good monopoly – Textbook chapter 5.3
3. **February 11.** Lecture 4: Price discrimination, bundling – Textbook chapter 6.1-6.3
4. **February 18. Problem set 1 due.** Lecture 5: Monopoly choice of product quality, asymmetric information, reputation, signaling, advertising. Textbook chapter 5.2
5. **February 25:** Lecture 6: Static Game theory. Lecture 7: Quantity competition (Cournot), free entry, mergers, welfare – Textbook chapters 7.0-7.2, 8.2
6. **March 3. Problem set 2 due.** Lecture 8: Price competition. Bertrand paradox – Textbook chapter 8.1, 8.3
7. **March 10: Midterm exam** in class.  
March 17. Harvard Spring Break
8. **March 24.** Lecture 9: Empirical methods industrial organization
9. **March 31:** Lecture 10: Dynamic games. Lecture 11: Pricing in dynamic oligopoly, Collusion, Multimarket contact. Textbook chapters 7.3, 9
10. **April 7. Problem set 3 due** Lecture 12: Product differentiation. Textbook chapter 14
11. **April 14.** Lecture 13: Strategic behavior. Entry accommodation, deterrence, capacity choice, learning by doing, vertical integration - Textbook chapter 10
12. **April 21.** Lecture 14: Advertising. Textbook chapter 14.3
13. **April 28. Problem set 4 due** Lecture 15: Antitrust, coordination, collusion, merger. Textbook chapters 5.5, 11. Lecture 16: Auctions Textbook chapter 6.4.

Final exam in May 2020