

Spring 2021

Economics 101: Intermediate Microeconomics

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Scarcity implies the need to make choices. Microeconomics is the study of how individuals and society make choices. That is, the study of how individuals respond to incentives and the resulting impact on social outcomes. The course will focus on how the terms of trade between buyers and sellers are set. The course emphasizes the development of the mathematical tools needed to reason carefully about incentives and necessitates a taste (or at least patience) for long chains of reasoning (see below for prerequisites).

This course is *not* a laundry list of facts to memorize or recipes to follow. Its purpose is to change the way you think. This will be accomplished by posing questions whose answers will challenge your intuition. Merely memorizing the questions and their answers is insufficient, one must understand the reasoning process by which one arrives at them. The questions change, and you will have to figure out your own answers.

The course requires you to perform computations that are useful to convince you of things that you might at first disbelieve. Regular homework assignments will aid you in these computations. In the recitations, TAs will cover problems typically drawn from a file of review problems (with solutions) posted on Canvas.

Logistic Overview

1. **Lectures** will be delivered synchronously via Zoom, during the regularly scheduled class time (Tuesdays and Thursdays, 10:30-12noon). The lectures will be recorded and available in Canvas. The Zoom details can be accessed from Canvas.
2. **Recitations** will be delivered synchronously via Zoom, during their regularly scheduled time.
3. **Office hours** will be conducted via Zoom, and are open to anyone, and you can simply “drop in.”
4. **Problem sets** will be assigned one per week (thirteen in total).
5. **The final exam** will be given at the scheduled time. The final will be a 24-hour open-book take-home exam that follows a similar structure to the homeworks.
6. **The final grade** will be determined by class participation (5%), the problem sets (65%), and the final exam (30%).

Course Material

1. A file of The lecture slides is posted on Canvas. These will be updated if necessary as the course progresses.
2. The structure of the course follows the text *Prices & Quantities: Fundamentals of Microeconomics* by Rakesh V. Vohra, 2020, Cambridge University Press. The text itself is optional. It is available online from Penn Libraries. See Canvas for details.
3. Review problems are posted on Canvas.
4. Optional for the course is: Jeffrey M. Perloff, *Microeconomics: Theory and Applications with Calculus*, fourth or fifth edition.
5. Perloff is not the only textbook of its kind available. There are many substitutes. For example, *Introduction to Economic Analysis* by McAfee, Lewis and Dale which is a free, open source text book available at <https://www.kellogg.northwestern.edu/faculty/dale/ieav21.pdf>

Logistic Details

1. **Canvas** is used to post announcements, slides, homework assignments, homework solutions, additional handouts, and other important materials. You are responsible for regularly checking, downloading and reading materials posted on the site, as they form an integral part of the class.
2. **Handouts, homework problems, solutions and other material prepared by the TAs and myself are *not* for distribution to those outside of the current class.** Sic Vos Non Vobis.¹
3. **Piazza** will be used for all class discussions and questions. Any questions to do with class material and organization should be posted there. Post all content-related questions about problem sets, lecture, and the course on piazza. This is a great way to collaborate with classmates. Course instructors will monitor, and occasionally post, on this forum. To enroll in piazza for this class, follow the following link: https://piazza.com/upenn/spring2021/srs_econ1010012021a.
4. **Email.** Use for correspondence that is not appropriate for piazza. Emails will receive a response within 24 hours Monday through Friday. *Include Econ 101 in the subject line.*
5. **Recitations.** I will post the problems to be covered in advance via Canvas. The problems for each session are selected to mirror those on the homework. The review sessions are for practice at the problems. Some, but not all, of the problems are of the cookbook variety. The non-cookbook problems are designed to tax your reasoning faculties rather than your ability to pattern match. **Recitations will commence on January 22, 2021.**

¹“For you, but not yours,” written by Virgil in response to plagiarism by Bathyllus.

6. **Homework assignments** are due 10:00AM on the due date. **No late work is accepted.**

Write-ups must be your original work. You may not use materials containing solutions or partial solutions to the assignments (including solutions prepared by current or former students). If your analysis contains information from outside sources, you should properly cite those sources.

While you are required to complete the assignments individually, I don't wish to discourage learning from one's peers. In particular,

- (a) discussing the *general* ideas behind the problems is permitted, but
- (b) writing formal solutions should be *completely individual*, done in the equivalent of separate rooms.

As discussions of general ideas gradually become more specific, some judgment is unavoidable, but here's the kind of interaction I have in mind: If a peer conveys an idea which seems central to the solution, *do not write it down.....immediately*. Approach the problem again on your own as if afresh, influenced by however much of their idea you remember. If you can re-create it without notes, you have mastered it, and I'm happy to give you credit. In this way we can let everyone help each other learn, while steering a wide berth around simple copying.

7. **Grading** The final grade will depend on

- Class/Piazza participation (5%).
- 13 Homework assignments (65%)
- Final exam (30%)

I anticipate the grade distribution to be roughly

A: 30-35%

B: 40-45%

C: 15-20%

8. The Economics Department Course Policies, which include rules about exams, make-up exams, grading appeals, etc., can be found at <http://economics.sas.upenn.edu/undergraduate/course-information/course-policies>.

Students are expected to abide by the Code of Academic Integrity in the completion of assignments and the final exam (<https://catalog.upenn.edu/pennbook/code-of-academic-integrity/>).

9. **Regrades:** Any request for a regrade must be in writing with a written explanation of the issue. The entire homework or exam is regraded, and there is no guarantee that the grade will not go down (this does not apply if the issue is a mistake in totaling the final score). While we make every effort to avoid errors, errors do occasionally creep in. Without an "all regrade" policy, a bias towards only correcting errors in one direction is introduced.

Tentative Course Calendar and Outline

These dates are not fixed in stone. I reserve the right to change them to adjust to the pace of the class.

DATE	TOPIC AND READINGS
1/21	Lecture 1: Introduction, the Rational Buyer Model, and Monopoly Vohra (V) §1.1–1.4
1/26	Lecture 2: Demand Sensitivity, and Consumer Surplus V §1.5–1.7, 2.1–2.5 Perloff (P) §5.1, Chapter 11
1/28	Homework Assignment 1 due at 10AM Philadelphia time. Lecture 3: Profit Maximization and Costs V §2.8, 2.10 P §7.1, 7.2
2/02	Course Selection Period Ends
2/02	Lecture 4: Welfare V §2.6 P Chapter 11
2/04	Homework Assignment 2 due at 10AM Philadelphia time. Lecture 5: Regulating a Monopoly V §, 2.7, 2.11, Chapter 3 P Chapter 12
2/09	Lecture 6: Sales V Chapter 3 P Chapter 12
2/11	Homework Assignment 3 due at 10AM Philadelphia time. Lecture 7: Price Discrimination V Chapter 3 P Chapter 12
2/16	Lecture 8: Strategic Behavior V Chapter 4 P Chapter 13
2/18	Homework Assignment 4 due at 10AM Philadelphia time. Lecture 9: Game Theory V Chapter 4 P Chapter 13
2/23	Lecture 10: Imperfect Competition V Chapter 4 P Chapter 14
2/25	Homework Assignment 5 due at 10AM Philadelphia time. Lecture 11: Sequential Games V Chapter 4 P Chapter 14

- 3/01 **Drop Period ends**
- 3/02 Lecture 12: Collusion
V Chapter 4
P Chapter 14
- 3/04 Homework Assignment 6 due at 10AM Philadelphia time.
Lecture 13: Product Differentiation I
V Chapter 4
P Chapter 14
- 3/09 Lecture 14: Product Differentiation II
V Chapter 4
P Chapter 14
- 3/11 Spring Break
- 3/16 Lecture 15: Preferences and Utility
V Chapter 5
P Chapter 3
- 3/18 Homework Assignment 7 due at 10AM Philadelphia time.
Lecture 16: Utility Maximization I
V Chapter 5
P Chapter 3, §5.2, 5.4
- 3/19 **Grade Type Change Deadline**
- 3/23 Lecture 17: Utility Maximization II
V Chapter 5
P Chapter 3, §5.2, 5.4
- 3/25 Homework Assignment 8 due at 10AM Philadelphia time.
Lecture 18: Utility Maximization III and Perfect Competition
V Chapters 5,6
P Chapters 2, 9
- 3/29 **Withdraw Deadline**
- 3/30 Student day off
- 4/01 Homework Assignment 9 due at 10AM Philadelphia time.
Lecture 19: The Exchange Economy
V Chapter 6
P Chapters 2, 9
- 4/06 Lecture 20: Competitive General Equilibrium
V Chapters 6
P Chapter 10
- 4/08 Homework Assignment 10 due at 10AM Philadelphia time.
Lecture 21: Competitive Equilibria with Production I
V Chapters 6
P Chapter 10
- 4/13 Lecture 22: Competitive Equilibria with Production II
V Chapters 6
P Chapter 10
- 4/15 Homework Assignment 11 due at 10AM Philadelphia time.
Lecture 23: Externalities I

	V Chapter 7
	P Chapter 17
4/20	Lecture 24: Externalities II
	V Chapter 7
	P Chapter 17
4/22	Homework Assignment 12 due at 10AM Philadelphia time.
	Lecture 25: Public Goods I
	V Chapter 7
	P Chapter 17
4/27	Lecture 26: Public Goods II
	V Chapter 7
	P Chapter 17
4/29	Homework Assignment 13 due at 10AM Philadelphia time.
	Lecture 27: Review

Prerequisites

Introductory microeconomics and macroeconomics (Econ 1 and 2); Math 104 and Math 114 or 115 or students who have received a B+ or better in Math 104 may take Econ 101 and Math 114 or 115 concurrently. Transfer students for Math 104 must complete Math 114 or 115 before enrolling in Econ 101. All enrollment is through permission of the department.

The course assumes multivariate calculus, and a **strong** understanding of these mathematical tools is crucial to success in the course.

1. Functions and Properties of Functions

- Monotonicity
- Continuity
- Concavity and Convexity
- Logarithmic functions
- Homogeneous functions

2. Derivatives

- How to take a derivative
- Product and Quotient Rules
- Chain Rule
- Partial derivatives

3. Solving optimization problems

- Unconstrained optimization: find the extrema of a function (maxima/ minima)

- Constrained optimization: Substitution method
- Constrained optimization: Lagrange's method
- Comparative statics of solution functions
- Comparative statics of optimal value functions

How to Study

1. The class is not a spectator sport, and it is important you don't approach it as such. Inspecting the answer to a problem or following the reasoning of another is insufficient to master the material; one needs to attempt problems and work through these difficulties on one's own before turning to the solution. If your "solution" does not agree with the provided solution, make sure you understand what you did wrong.
2. Space your practice out rather than compressing it into a short period.
If you spread five hours of study into one hour a day, you'll remember more than if you study for five hours on one day. Memories have a short half-life and need reinforcement.
3. Practice retrieving information rather than recognizing it.
Don't mistake the ability to recognize something for an ability to recall it. In an exam you don't get marks for things being familiar, you get marks for recalling relevant information and using it to answer the question.
4. Figure out what you don't know.
Revision is not for reassurance but to identify what you don't know or understand.