

Spring 2025

# Economics 2100: Intermediate Microeconomics

**Preliminary**

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## 1 Introduction

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 emphasizes the development of the 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.

## 2 Logistic Overview

1. **Lectures** will be delivered in person during the regularly scheduled class time (Tuesdays and Thursdays, 10:15-11:45).

Lecture recordings will only be available to students who miss class for an approved reason.

2. **Recitations** will be delivered in person during their regularly scheduled time.
3. **Office hours** are open to everyone, and you are encouraged to simply “drop in.”
4. **The final grade** will be determined by the best 8 out of 10 homeworks (15%), three midterm exams (45%), and a final exam (40%).

I anticipate the grade distribution to be roughly

A: 30-35%

B: 40-45%

C: 15-20%

## 3 Important Dates

1. First class Jan 16, 2025
2. Recitations begin Jan 17, 2025
3. First In-Class Midterm Exam Feb 11, 2025
4. Second In-Class Midterm Exam Mar 6, 2025
5. Third In-Class Midterm Exam Apr 8, 2025
6. Final Exam to be announced by registrar

## 4 Prerequisites

Introductory microeconomics and macroeconomics (Econ 0100 and 0200); Math 1400/1410 or Math 1070/1080. 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

# 5 Course Material

1. A file of the lecture slides (as well as a handout version) 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://open.umn.edu/opentextbooks/textbooks/47>

## 6 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.**
3. **Ed Discussion** 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. There is a link to Ed Discussion in canvas.
4. **Email.** Use for correspondence that is not appropriate for Ed Discussion. Emails will receive a response within 24 hours Monday through Friday. *Include Econ 2100 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 17, 2025.** This will be a review session covering optimization.
6. **Homeworks must** be uploaded on Canvas. **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 (this includes any use of AI tools such as chatGPT).

While you are required to complete the assignments individually, I encourage learning from one's peers. In particular,

- (a) discussing the *general* ideas behind the problems is always a good idea, 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.

- **All deadlines are strict**—no submissions will be accepted after the deadline. Since you may experience connectivity issues, do **NOT** wait till the last minute before uploading. **NO EXCEPTIONS.** You can resubmit your solutions before the deadline, so there is absolutely no reason to wait to the last minute to submit your final version!
- Check your submission once uploaded to make sure you have uploaded the correct file, and that it is legible. **THIS IS YOUR RESPONSIBILITY!**
- The upload option is restricted to PDF. You can scan your homework using a free phone app such as Dropbox or Genius Scan. This is important for two reasons: the scanning app enhances the image to make it more legible and the result is a **single** PDF file that you can then upload on Canvas.
- Submissions **must** use the following format: the answer is to be clearly displayed **first**, demarcated, and followed by a justification written in clear, concise English. Mangled streams of consciousness should be avoided. Variables and functions should be defined. Marks are deducted for submissions that don't follow this format, are hard to read or incomprehensible. The solutions given in the packet of review problems illustrate how solutions should be presented.
- **Advice on how to write out solutions:** Your solutions should be written in English, similar to the structure of the posted solutions. At times, the posted solutions provide additional details that a correct answer will not need. However, it is typically the case that in order to appropriately justify your answer, you will need to explain *why* you are doing a particular calculation. It is not enough to present a correct calculation, you need to provide enough detail so we know why you did that calculation.

Writing out the structure of your argument is also beneficial to you, because it will help you clarify your own thinking.

7. 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 exams (<https://catalog.upenn.edu/pennbook/code-of-academic-integrity/>).

8. **Regrades:** Any request for a regrade must be in writing to me with a written explanation of the issue (email is fine). Any request for a regrade of a homework or exam must be submitted within one week of the posting of the grade. I will discuss the request with the grader and communicate the result with you. 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.