

**SYLLABUS**  
**ECON 6100-001: Microeconomic Theory**  
**University of Pennsylvania**  
**August 18, 2023**

**Professor.** Steven A. Matthews <stevenma@econ.upenn.edu>

Office hours: 3:45-4:45 pm Thursdays in 618 PCPE, and by appointment

**Teaching Assistant.** Pawel Bednarek <pbed@sas.upenn.edu>

Office hours: 4-5 pm Wednesdays, and by appointment

<b>Emailing.</b> Please include “ECON 6100” in the subject line of emails to us
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**Lectures.** TR, 1:45-3:14 pm, location PCPSE 200

**Description.** The course is designed for Wharton PhD students and undergraduate math econ majors. Its topics are listed below. The goal is to provide a solid grasp of the methods and models used in neoclassical microeconomic theory.

**Prerequisites.** Multivariable calculus (*at least* through Math 1080 or 1410), some real analysis (open, closed and compact sets, convergence, continuity), probability theory (continuous distributions, expectation), optimization (first-order, second-order conditions for constrained optima), and intermediate micro (Econ 2100). To determine if you have the mathematics prerequisites, make sure you can readily the Mathematical Appendices in our textbook *JR* (see below). Some of the basics are well covered in Martin Osborne’s math tutorial:

<https://mjo.osborne.economics.utoronto.ca/index.php/tutorial/index/1/int/i>.

**Class Structure.** Lecture slides and often corresponding lecture videos will be posted on Canvas. Most of the videos were recorded in Fall 2020, so be aware that some of the lecture material has evolved since then – I’ll alert you to major departures. I suggest you look at the slides for each class before coming to the class.

**Textbooks.**

The main textbook is Jehle and Reny (JR), *Advanced Microeconomic Theory*, 3<sup>rd</sup> ed. Lectures will be taken from selected topics in Chapters 1-5. as well as some outside material. JR has an excellent Mathematical Appendix – *please spend time with it*.

If you want to consult supplementary texts, I suggest the encyclopedic Mas-Colell, Whinston and Green, *Microeconomic Theory*. Another good one is *Microeconomic Analysis*, 3<sup>rd</sup> ed., by Hal Varian.

A *very useful* complete textbook on the math is Simon and Blume, *Mathematics for Economists*.

**Assessment.** Three non-cumulative midterms, each one worth 25% towards the course grade. Nine problem sets, collectively worth 25%. If you miss one midterm for an excused absence,<sup>1</sup> the other two midterms and the homework each count 33 $\frac{1}{3}$ %.

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<sup>1</sup>See <https://economics.sas.upenn.edu/undergraduate/course-information/course-policies>.

**Homework.** Study groups for doing the problems sets are encouraged, but they should be written up individually. Problem sets will be posted about a week before they are due. Each problem set will be graded coarsely on a 0-3 scale. Late homework will not be graded. However, one of your problem sets with the lowest score will not be counted when calculating your homework score.

Due dates for the problem sets are listed below. With one exception, they are due at 11:45pm on Fridays, turned in electronically as pdfs to the course Canvas page. The exception is Problem Set 2, which is due at 11:45pm on Thursday, Sept 14.

## Dates

- First Lecture: 8/29
- Fall Break and Thanksgiving (no class): 10/12 and 11/23
- Problem Set Due Dates:

PS	1	2	3	4	5	6	7	8	9
Due	9/8	9/14(Th)	9/22	10/6	10/20	10/27	11/10	11/17	12/1

- Exam Dates: 9/28 (Mid 1), 11/2 (Mid 2), 12/7 (Mid 3)

## Topics

1. Introduction: Economics and Mathematics
2. Consumer Theory
  - (a) Preferences and utility maximization
  - (b) Expenditure minimization and duality
  - (c) Demand functions: Slutsky equation and matrix
  - (d) Consumer surplus and compensating variation
3. Choice Under Uncertainty
  - (a) Expected utility
  - (b) Risk aversion
4. Producer Theory
  - (a) Technology
  - (b) Profit maximization
  - (c) Cost minimization and duality
5. Competitive Equilibrium
  - (a) Edgeworth boxes
  - (b) Existence and welfare theorems
  - (c) Arrow-Debreu and incomplete markets
6. Externalities and Public Goods
  - (a) Bargaining
  - (b) Pigouvian taxes
  - (c) Voluntary contribution
  - (d) Lindahl equilibrium