

## Syllabus

### ECON 681-001: Microeconomic Theory

Version: August 26, 2021

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

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

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Office hours: TBA, and by appointment

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

**Prerequisites.** Multivariable calculus (*at least* through Math 114), 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 101).

**Lectures.** TR, 12-1:30 pm in 200 PCPSE

**Emailing.** Please include “ECON 681” in the subject line of emails to us.

**Class Structure.** The methodology will be roughly the “flipped classroom” Lecture slides will be posted on Canvas for each class, together with video lectures (recorded last year). The lecture slides accompanying these lecture videos will be posted in advance of the class in which that material will be discussed – you should either read the slides or watch the video before the class, if not both. and be prepared to ask questions. In class we will also discussing examples and solve problems.

**Assessment.** There will be three non-cumulative midterms, and nearly weekly problem sets. Each midterm counts 29% toward the course grade, and the problem sets 14%. If you miss one midterm for an excused absence,<sup>1</sup> the other two midterms each count 40% and the homework 20%.

**Homework.** There will be no problem sets in the weeks in which there is an exam. 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, and they will be due by 3 pm Fridays, through Canvas.

**Textbooks.** To determine if you have the prerequisites for the course, take a look at Hal Varian, *Intermediate Microeconomics: A Modern Approach*, and at Martin

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<sup>1</sup>Excused absences and other course policies are defined at <https://economics.sas.upenn.edu/undergraduate/course-information/course-policies>.

Osborne's online mathematical tutorial at <https://mjo.osborne.economics.utoronto.ca/index.php/tutorial/index/1/int/i>. You should not expect to know everything covered in these sources, but most.

Our main textbook is Jehle and Reny (JR), *Advanced Microeconomic Theory*, 3<sup>rd</sup> ed. We will cover selected topics from Chapters 1-5. The relevant portions of JR for each set of lecture slides will be noted on the first page of the slides. 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* book on the math used in economics is Simon and Blume, *Mathematics for Economists*.

## Dates

- 8/31: First Lecture
- 9/7 and 9/16: TBA. The professor cannot lecture on these days.
- 10/14 and 11/25: No class (Fall Break and Thanksgiving)
- Sept 10, 17, 24; Oct 8, 22, 29; Nov 5, 19; Dec 3: Problem set due dates
- 9/30 11/11, and 12/9: Midterm Dates (in class)

## 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