API 109 Advanced Microeconomic Theory

Teaching Team

Instructor: Luis Armona larmona@hks.harvard.edu

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CAs:
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For all course questions, please send an email to **api109hks@gmail.com** . The teaching team all have access to this gmail and will respond as promptly as possible

Schedule:
Class Meetings: Mondays & Wednesdays 10.30–11.45 in W436
Review Sessions: Fridays 1:30pm-2:45pm or 3:00pm-4:15pm, in Starr Auditorium
Instructor Office Hours (OH): Thursdays, 9:00am-10:30am, in Taubman 452, or by appointment (email)
Gamarra Flores TF OH: N/A
Salazar CA OH: N/A
Srivastava CA OH: N/A
Vicuna CA OH: N/A

Overview
API 109 is the first semester of the two-semester sequence in advanced microeconomics for MPA/ID students. The goal of the course is to prepare students to analyze applied problems in international development using the tools of modern microeconomic theory, and understand the conceptual framework of modern microeconomic theory, and the fundamental "language" of economics. The course is a graduate-level course in microeconomic theory with an eye toward policy applications in development economics.

Course Structure
The lectures will heavily focus on the theoretical foundations of economics, presenting new material each lecture (except for those labeled as review). Students are expected to attend each lecture. If you are unable to attend on a particular day, lectures will be recorded and posted to Canvas. In the Friday Sections, the TF will teach an application related to development and the material covered in class. Because there is a lot of material, there will be little time during lecture to cover applications, therefore it is *highly* recommended that you attend the Friday sections to better understand how the theoretical material can be applied in economic analysis. There are two available time slots for the Review Section, attend whichever you prefer according to your own schedule, the same material will be covered.

The TF, CAs, and I will each have hour long office hours each week (mine will be 90 minutes). Use this opportunity to discuss the class material in a more personalized fashion. If you cannot make any of these, I may be available to hold short appointments with you one and one, as a last resort, to be scheduled via email to me.

Prerequisites

This course is intended for first-year MPA/ID students. If you are not in the MPA/ID program, you will be admitted only with the permission of the instructor and under extreme circumstances. If you are interested in taking a course on advanced microeconomic theory, you should consider taking API 111, which is cross-listed as ECON 2020a and HBS 4010, which is the analogous Ph.D. level course on microeconomic theory.

In terms of prerequisites for the course content, a comprehensive grasp of multivariate calculus is necessary. Familiarity with probability theory, optimization, and linear algebra are extremely helpful. Because mathematical proofs are a core part of microeconomic theory, a comfort level with this sort of reasoning will be extremely helpful. Otherwise, supplementary knowledge for handling the course material will be handled at the MPA/ID Math Camp.

Course Materials

I will teach primarily out of Nolan Miller's Notes on Microeconomic Theory (NM). These are publicly available and can be downloaded here: https://nmiller.web.illinois.edu/notes.html

The standard core textbook for advanced microeconomic theory is "Microeconomic Theory" By Mas-Colell, Whinston, and Green (MWG). I will assign analogous passages from this textbook to each NM reading. Students are not required to purchase the textbook. This textbook is a bit more mathematically rigorous and detailed compared to NM, and may be helpful for reviewing the material if you are unsure if you are grasping the NM readings. In addition, this will be the core text for the later part of the class, which will go over material that is not covered by NM. I will upload material to the Canvas website when these are required readings, along with lecture slides any other supplementary readings recommended before each lecture.

Course Assignments:
The course will be graded based on six problem sets, a midterm, and a final exam.
Course grades will be adjusted based on overall performance, and in line with the grading curve of other HKS courses.

Grade Components:
- Problem Sets (6 total): 30%
- Midterm: 25%
- Final:45%

Problem Sets

Problem sets will be due on Mondays at 8:30am, approximately every 2 weeks, except around the midterm. Problem sets *must* be uploaded online to Canvas in PDF form before this time. Students may upload problem sets multiple times before the deadline if they update their answers. As a general rule, *no late problem sets will be accepted except under extreme circumstances*. Grading of problem sets will be done on the basis of a "Check+/Check/Check-/No Credit" system. You are encouraged to work on these problem sets in groups of no more than four students. However, you must hand in independently written solutions. Please identify all students you worked on the problem set with if you worked in a group. Problem sets are the primary way course material is actually learned. If in a group, I encourage you to try all problems on your own, then meet to discuss the reasoning each group member had for each problem in the assignment. The exam questions, which comprise the vast majority of the grades, will be similar to the problem sets, so excelling on these questions will be the best way to prepare for the exams. The Problem set due dates are below:

- Problem Set 1: 9/11
- Problem Set 2: 9/25
- Problem Set 3: 10/02
- Problem Set 4: 10/30
- Problem Set 5: 11/13
- Problem Set 6: 11/27

Exams

Exams are in-person and scheduled for the following dates:
- ˆ Midterm Exam: 10.30–11.45, October 11, 2023. Note it is during Lecture time.
- ˆ Final Exam: 09.00–12.00, December 14, 2023.

Both exams are in-person, and will be open book, however *no computers will be allowed*, so you should print the lecture notes in advance of exams. If you know you cannot make these dates, and there are exceptional circumstances as to why you cannot attend, please contact me directly and we may discuss alternative options.

Academic Integrity

Students are encouraged to work together and discuss class material and assignments. What is important is the eventual understanding of material achieved, and less about how that is achieved. Any exam, paper or assignment you submit is presumed to be your own original work, so if you do – as you will – use words or ideas written by other people, please make sure to cite these appropriately, and to indicate other students with whom you have collaborated. It is also a violation of the HKS Academic Code to incorporate into your coursework text produced predominantly by generative AI. More information about Harvard's policies on academic integrity may be found in the Student Handbook.

Accessibility and Accommodations for Student Learning

Harvard University values inclusive excellence and providing equal educational opportunities for all students. Our goal is to remove barriers for disabled students related to inaccessible elements of instruction or design in this course. If reasonable accommodations are necessary to provide access,

please contact the local disability coordinator, Melissa Wojciechowski St. John (melissa_wojciechowski@hks.harvard.edu). She is the Senior Director of Student Services in the HKS Office of Student Services. Accommodations do not alter fundamental requirements of the course and are not retroactive. Students should request accommodations as early as possible, since they may take time to implement. Students should notify Melissa at any time during the semester if adjustments to their communicated accommodation plan are needed

Course Schedule

- 08/28: Lecture 1: Intro + Foundation of Preferences
    - Required Readings: NM 3.1, Syllabus
    - Suggested Readings:
        - MWG 3.A-3.B;
        - Duflo, Esther. "The economist as plumber." *American Economic Review* 107.5 (2017): 1-26.
- 08/30: Lecture 2: Utility + Budgets
- Required Readings: NM 3.2, 2.1
    - Suggested Readings: MWG 2.A-2.C, 3.C
- 09/04: Labor Day (NO CLASS)
- 09/06: Lecture 3: Demand Functions
    - Required Readings: NM 2.2-2.2.7
    - Suggested Readings: MWG 2.E-2.F
- 09/11: Lecture 4: Choice Theory: Utility Maximization
    - Required Readings: NM 3.3
    - Suggested Readings: MWG 3.D
- 09/13: Lecture 5: Choice Theory: Expenditure Minimization, Comparing Demand Functions
    - Required Readings: NM 3.4 (up to and including 3.4.6)
    - Suggested Readings: MWG 3.E-3.G
- 09/18: Lecture 6: Welfare Evaluation
    - Required Readings: NM 3.4.7-3.4.8
    - Suggested Readings: MWG 3.I
- 09/20: Lecture 7: Aggregating Demand
    - Required Readings: NM 4.1-4.3
    - Suggested Readings: MWG 4
- 09/25: Lecture 8: Endowments and Intertemporal Choice
    - Required Readings: NM 4.4-4.6
    - Suggested Readings:MWG 15.B 20.A, 20.B
- 09/27: Lecture 9: Choice Under Uncertainty I: Expected Utility Maximization
    - Required Readings: NM 6.1
    - Suggested Readings: MWG 6.A-6.B
- 10/02: Lecture 10: Choice Under Uncertainty II: Risk Preferences
    - Required Readings: NM 6.2-6.4
    - Suggested Readings: MWG 6.C-6.E
- 10/04: Lecture 11: Midterm Review
- 10/09: Columbus/Indigenous People's Day (NO CLASS)
- 10/11: MIDTERM
- 10/16: Lecture 12: Producer Theory I: Production Technology
    - Required Readings: NM 5.1, 5.2, 5.5, 5.8
    - Supplementary Readings: MWG 5.A, 5.B, 5.C (up to *Cost Minimization* Section, p. 139) 5.D
- 10/18: Lecture 13: Producer Theory II: Duality and Aggregation in Production

- Required Readings: NM 5.3, 5.4, 5.6, 5.7, 5.9
- Supplementary Readings: MWG 5.C (*Cost Minimization* Section) 5.E-5.G
- 10/23: Lecture 14: Monopoly
    - Required Readings: NM 9.1, 9.2, 9.4
    - Supplementary Readings: MWG 12.B, *Nonconvex Production Technologies and Marginal Cost Pricing* Section of MWG 16.G (p.570-572
- 10/25: Lecture 15: Price Discrimination + Multi-Product Pricing
    - Required Readings: NM 9.3.9.5
    - Supplementary Readings: "Ch.10: Price Discrimination" in Volume I of *Handbook of Industrial Organization*, by Hal Varian (Accessible via harvard University, https://www.sciencedirect.com/science/article/abs/pii/S1573448X89010137)
- 10/30: Lecture 16: Partial Equilibrium I: Competitive Equilibrium
    - Required Readings: NM 7.1, 7.2
    - Supplementary Readings: MWG 10.A-10.C
- 11/01: Lecture 17: Partial Equilibrium II: Welfare Theorems
    - Required Readings: NM 7.3
    - Supplementary Readings: MWG 10.D-10.E
- 11/06: Lecture 18: General Equilibrium I: Exchange Economies
    - Required Readings: MWG 15.A-15.B
    - Supplementary Readings: 16.A
- 11/08: Lecture 19: General Equilibrium II: Demand + Supply
    - Required Readings: MWG 15.C-15.D, ,16.A-16.B
    - Supplementary Readings:
- 11/13: Lecture 20: General Equilibrium III: Welfare and Pareto Optimality
    - Required Readings: MWG 16.C-16.E
    - Supplementary Readings:
- 11/15: Lecture 21: Externalities and Public Goods
    - Required Readings: NM 8
    - Supplementary Readings: MWG 11.A-11,C
- 11/20: NO CLASS
- 11/22: Thanksgiving Recess (NO CLASS)
- 11/27: Lecture 22: Social Choice, Government Policy and Equilibrium
    - Required Readings: N/A
    - Supplementary Readings: MWG 11.E, 21.A-21.C, 22.C,
- 11/29: Lecture 23: Final Review