Carnegie Mellon

47-801 Microeconomics II
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Mini II 2006
Lecture: M,W 10:30-12:20
Room: GSIA 318
Office Hrs: Tues 10–11 AM

Syllabus

This course is a rigorous introduction to the core models of microeconomic theory. 47-800 built the foundations of consumer choice, producer theory, and competitive (partial) equilibrium. In this course, the focus will be on general equilibrium theory and on social choice and implementation theory. Although game theory and contract theory are introduced and discussed in some detail, they will not receive full treatment as they are offered as separate courses within the Tepper school.

This course is aimed at students in economics, finance, and related fields. The treatment of the topics will be fairly mathematical and it will be expected that students be familiar with real analysis and optimization. By the end of this semester, the student will have the tools to not only use microeconomic models at an advanced level, but to begin looking into research extending these basic models into more advanced applications.

The core textbook is Mas-Colell, Whinston, & Greene (MWG) and lectures will generally come from that book. I highly recommend Kreps' book as a very nice introduction to preference theory and choice theory. I also recommend Ellickson's book as a good source for mathematical knowledge, although it is quite abstract. Economics PhD students in particular are highly encouraged to buy all of the recommended texts (except maybe the *Handbook*,) as each is an excellent resource.

Required Texts:

- *Microeconomic Theory*, by Mas-Colell, Whinston, & Greene ("MWG"). This is the bible of microeconomics. It's encyclopedic, but a reference that every economist absolutely must have and know forward and backward. Some chapters read better than others, so picking up an alternative text is a good idea.

Recommended Texts:

- *Notes on the Theory of Choice*, by David Kreps ("Kreps"). Microeconomics is built utility theory, and this is a wonderful little book that introduces preferences, utility representation, and the 3 main models of choice under uncertainty. Chapters 5 and 8-9 are particularly useful, and Chapter 11 is a fun read.

- *Competitive Equilibrium: Theory and Applications*, by Ellickson. Very concise and a great resource for all the math you'll need, but it's not any better than MWG for getting intuition.

- *General Equilibrium Theory: An Introduction*, by Starr. This is really an advanced undergrad text, but if you're having a tough time with the math or the understanding, this is a good place to get back on track. However, the distribution of topics covered is a bit skewed, so it may not cover everything we do.

- *Microeconomic Analysis*, by Varian. If a PhD course on microeconomics doesn't use MWG, it almost certainly uses this book. It's a good substitute, but maybe a bit terse on the general equilibrium side of things. Might be useful for the first mini.

- *A Course in Microeconomic Theory*, also by Kreps. Much like Varian's book: everything's there, but he focuses on things we're going to skip and he gets to general equilibrium pretty quickly. But Kreps is a good writer and waxes philosophical, so this can be a good supplement.

- *The Handbook of Mathematical Economics*, ed. by Arrow & Itrilligator. Very expensive four-volume set for the math jocks who really want to do theory. The first volume is just a math textbook for economists, and the 2nd book covers most of what we'll do in class, but even more rigorously. Volume 3 is mostly mechanism design and volume 4 is extensions to the basic model that are used often in research.

- *Game Theory* by Fudenberg & Tirole, *Game Theory* by Roger Myseron, or *A Course in Game Theory* by Osborne & Rubinstein. These are three good texts in game theory, although for the purposes of this class, the chapters in MWG would be sufficient.

Problem Sets: Worth 25% of your grade.*

In this class, "homework" and "problem sets" are two distinct entities. During lecture, I will point out questions or proofs that you should work out on your own at home. This is homework and it will not be collected or graded. Once every 3 or 4 lectures, I'll assign a problem set that you must complete and turn in within 1 week of it being assigned (if it is assigned on Wednesday, it is due by the beginning of class the following Wednesday.) Turn in your problem set solutions to the TA, who will mark them. I will then look them over and assign a grade from 1 to 10. A score of 10 is reserved only for excellent, thorough work.

Many homework problems will appear on the problem sets, so if you do your homework, you'll already be partially finished with the upcoming problem set.

**If you do not make a reasonable attempt at every problem set, you will not pass the course.*

Final Exam: Worth 75% of your grade.

This will be a 3-hour in-class exam at the end of the term.

Topics:

- I: PARTIAL EQUILIBRIUM
  - Competitive Equilibrium & Optimality (MWG 10.B)
  - Partial Equilibrium (The Undergrad Model) (MWG 10.C)
  - The Welfare Theorems, Part I (MWG 10.D)
  - Welfare Analysis (MWG 10.E)
  - Long-Run Equilibrium (MWG 10.F)
  - Market Failure: Monopoly (MWG 12.B)
- II: INTRO TO GENERAL EQUILIBRIUM
  - Pure Exchange: The Edgeworth Box (MWG 15.B)

- 2x2 Production: A Quick Example (MWG 15.D)
- General vs. Partial Equilibrium (MWG 15.E)
- The Model With Production (MWG 16.B)
- The Welfare Theorems (MWG 16.C-D)
- Lindahl Equilibrium (MWG 16.G.3)

- III: POSITIVE THEORY OF EQUILIBRIUM
  - General Existence of Walrasian Equilibrium (MWG 17.B-C)
  - Equilibrium Uniqueness & Index Theory (MWG 17.D)
  - Are We in Equilibrium? (MWG 17.E)
  - Uniqueness & Gross Substitutes (MWG 17.F)
  - Comparative Statics (MWG 17.G)
  - Tâtonnement Adjustment Process (MWG 17.H)

- IV: FOUNDATIONS OF EQUILIBRIUM
  - The Core (MWG 18.B)
  - Core Convergence & Equal Treatment (MWG 18.B)
  - Noncooperative Foundations (MWG 18.C)
  - Limits to Redistribution (MWG 18.D)

- V: GE UNDER UNCERTAINTY
  - Contingent Commodities & Arrow-Debreu Equilibrium (MWG 19.B-C)
  - Sequential Trade (MWG 19.D)
  - Asset Markets (MWG 19.E)
  - Incomplete Markets (MWG 19.F)
  - Firms in Incomplete Info (MWG 19.G)
  - Imperfect Information (MWG 19.H)

- VI: GE AND TIME
  - Intertemporal Utility (MWG 20.B)
  - Intertemporal Production and Efficiency (MWG 20.C)
  - One-Consumer Case (MWG 20.D)
  - Stationary Paths, Interest Rates, and Golden Rules (MWG 20.E)
  - Dynamics (MWG 20.F)
  - Several Consumers (MWG 20.G)
  - OLGs (MWG 20.H)
  - Back to Tâtonnement (MWG 20.I)

- VII: CHOICE UNDER UNCERTAINTY
  - von Neumann-Morgenstern Expected Utility (Kreps 5)
  - Intro to Subjective Expected Utility: The Savage Model (Kreps 8,9)
- VIII: GAME THEORY
  - Strategic Form Games (MWG 7.D)
  - Dominant Strategies & Nash Equilibrium (MWG 8.B, 8.D)
  - Extensive Form Games & Subgame Perfect Equilibrium (MWG 7.C, 9.B)
  - Bayesian Games & Bayes-Nash Equilibrium (MWG 8.E)
- IX: OLIGOPOLIES
  - Oligopoly (MWG 12.C-D)
  - Oligopoly $\rightarrow$ Perfect Competition (MWG 12.F)
- X: EXTERNALITIES
  - Basic Externalities (MWG 11.B)
  - Public Goods (MWG 11.C, Notes)
  - Multilateral Externalities (MWG 11.D)
  - Second-Best Outcomes (MWG 11.E)
  - Information Externalities: Market For Lemons (MWG 13.B)
- XI: SOCIAL CHOICE & MECHANISM DESIGN
  - Arrow's Impossibility Theorem (MWG 21.C)
  - Gibbard-Satterthwaite Theorem (Notes, MWG 23.C)
  - Groves Mechanisms (Notes, MWG 23.C)
  - Revelation Principle (Notes)
  - Application: Optimal Auctions (Handout)
  - Nash Implementation: Maskin's Theorem (Notes)
  - Groves-Ledyard Mechanism (Notes)
  - Application: Competition & Efficiency in Lemons Markets (Handout)