

ECON 702.00 Microeconomic Theory II

Course Syllabus

Spring Semester, 2018

Instructor: Matthew J. Baker

Meeting time and place: Thursday, 9:30 - 12:30, TBD

Office: At the GC: 5313.03. At Hunter: West 1532

Overview: This course covers advanced microeconomic theory. The course consists of four parts, the first three of which are game theory, information, and equilibrium. The last part of the course unifies some of the concepts from the first three parts, and functions partly as a survey of some applications of the theory developed in the first three parts of the course. Course material is organized so that it can be covered in roughly 14 three-hour lectures.

Learning Goals and Outcomes:

1. Students will learn how to use calculus, linear algebra, real analysis, and convex analysis to formulate and solve core microeconomic models.
2. Students will learn how to classify economic phenomena; that is, students will learn how to match real-world phenomena to basic economic models.
3. Students will learn the mechanics and mathematics of the proofs of fundamental economic theorems, such as the first and second welfare theorems, and the equilibrium existence theorems of Nash and Debreu.
4. Students will learn common short cuts that can be used to simplify and solve common economic models.

These learning goals involve mathematical, problem-solving skills and analytical skills that are demonstrated by solving problems, writing proofs, and using computer software. Problem sets, exams, and class discussion will be used to assess how well students are meeting these objectives.

Text and other readings: The primary text for the course is:

[MWG] Mas-Colell, A., M. Whinston, and J. Green. 1995. *Microeconomic Theory*. New York and Oxford: Oxford Univ. Press.

I have also relied on the following books in assembling lectures. When I consulted one of the following sources extensively in building lectures, I have noted this in the appropriate place on the course outline. These sources are a bit easier going, and might provide some help in which the student finds it hard to follow the presentation in **MWG**.

- [AC] Aliprantis, C. and S. Chakrabarti. 2000. *Games and Decision Making*. New York and Oxford: Oxford Univ. Press.
- [E] Ellickson, B. 1993. *Competitive Equilibrium: Theory and Applications*. Cambridge and New York: Cambridge Univ. Press.
- [JR] Jehle, G. and P. Reny. 2001. *Advanced Microeconomic Theory, 2nd. ed.*. Boston: Addison Wesley.
- [M] Muthoo, A. 1999. *Bargaining Theory with Applications*. Cambridge and New York: Cambridge Univ. Press.
- [R] Rasmusen, E. 2001. *Games and Information, 3rd. ed.* Malden, Mass. and Oxford: Blackwell.
- [V] Varian, H. 1992. *Microeconomic Analysis, 3rd. ed.* London and New York: Norton.
- [W] Wolfstetter, E. 1999. *Topics in Microeconomics*. Cambridge and New York: Cambridge Univ. Press.

At times, I will also reference articles in class; the exact sources are frequently given in the course notes. Students may wish to consult these articles for more advanced material.

Prerequisites: chapters 1-6 of **MWG**, or better yet, chapters 1-14 of **V** or chapters 1-4 of **JR** - i.e., the first half of an advanced microeconomic theory book. It is assumed that students have a decent working knowledge of basic microeconomic theory, including the theory of cost and production, utility and consumer demand, duality and partial equilibrium analysis. Moreover, it is assumed that students have a working knowledge of multivariable calculus and analysis. While not required, it is recommended that students have some familiarity with a symbolic-math-capable software, such as **Maple**, **Mathcad**, or **Matlab**. **Maple** - a powerful computer package with wide-ranging symbolic computation abilities - is available for free download for CUNY students at the CUNY E-mail website. More recently, I have started relying on IPython notebooks and the powerful symbolic computing package **sympy**.

Grading: 90% of the final grade will be determined by performance on a midterm and final exam (with each exam weighted equally, so that each exam contributes 45% of the final grade. The remaining 10% will be determined by instructor discretion. Problem sets will be assigned (roughly) every two to three weeks throughout the semester. A rough guess is that the midterm exam will be held following discussion of the material in section 2 of the course outline below.

Course Notes: As the course progresses, course notes will be posted at the course blackboard site. These notes will contain literature references, possible extensions, examples worked in class, etc. Generally speaking, the course notes are a bit more expansive than what is discussed in class. The latter, not the former, is a more accurate guide to exam coverage.

Other materials: For students wishing to get a bit more practice, I also maintain a list of problems from books that I think are particularly relevant to the material; I have supplemented the list with problems from prelims and past exams as well. I will post this list on the course blackboard site at some point in the first few weeks of the semester.

Course Outline: The attached course outline gives a rough chronology of topics and readings for the course.

1 Game Theory

1.1 Simultaneous-move games

Reading material: Chapters 7 and 8 of **MWG**.

Topics: extensive and normal-form games, dominant and dominated strategies; randomization across strategies; equilibrium concepts; games of incomplete information and Bayes-Nash equilibrium. Time: Two weeks.

Also see: **AC**, Chapters 1-4; **R**, Chapters 1-3; **V**, Chapters 15-16.

1.2 Dynamic games

Reading material: Chapter 9 of **MWG**, with appendix A.

Topics: Sequential rationality, backwards induction, and subgame perfection; infinite horizon games. Time: Two weeks.

Also see: **R**, Chapters 4-6.

2 Information

2.1 Adverse selection

Reading material: Chapter 13 of **MWG**.

Topics: Adverse selection problems; signalling; screening. Time: One week.

Also see: **R**, Chapters 8-9; **V**, Chapter 25; **W**, Chapters 9-10.

2.2 Principal-agent problems and moral hazard

Reading material: Chapter 14 of **MWG**.

Topics: Hidden actions; hidden information. Time: One week.

Also see: **R**, Chapter 7; **V**, Chapter 25; **W**, Chapter 11.

3 Equilibrium

3.1 Partial Equilibrium Analysis

Reading material: Chapters 10 and 12 of **MWG**.

Topics: A quick review of demand theory and welfare concepts. Partial competitive equilibrium in the long and short run. Time: Two weeks.

Also see: **JR**, chapter 4; **V**, chapter 10.

3.2 Externalities and Public Goods (time permitting)

Reading material: Chapter 11 of **MWG**.

Topics: Externality problems and policy solutions. Time: One week.

Also see: **V**, chapters 23-24.

3.3 Basic GE models and welfare theorems

Reading material: chapters 15 and 16 of **MWG**.

Topics: pure exchange models; representative agent models; the first and second welfare theorems. Time: Two weeks.

Also see: **V**, Chapter **JR**, Chapter 5.

3.4 Topics in GE analysis

Readings: parts of chapters 17 and 18 of **MWG**.

Topics: existence of equilibrium; uniqueness of equilibrium; stability of equilibrium; computation; equilibria over a continuum. Time: One week.

Also see: **E**, chapter 3.

4 Unifying concepts and extended topics

Note: this part of the course will focus more on surveying relevant concepts from the below-mentioned fields and how they can be built up from previous material, rather than formally demonstrating all aspects of the theory.

4.1 Bargaining

Reading material: **M**, chapters 1-3.

Topics: Splitting a (general) pie, the Nash and alternating-offers solutions. Time: One week

Also see: **AC**, chapter 7; **R**, chapter 12.

4.2 Auctions and Mechanism Design

Readings: **MWG**, chapters 21-22.

Topics: Auction equivalence, “mechanism” defined. Time: One week.

Also see: **AC**, chapter 6; **R**, chapters 10 and 13, **W**, chapter 8.

4.3 Matching Markets

Readings: **W**, chapter 7.

Topics: Marriage markets.