MICROECONOMICS I

PART A:
GENERAL EQUILIBRIUM THEORY AND WELFARE ECONOMICS

COURSE DESCRIPTION

This segment of the Ph.D. course sequence in microeconomic theory will cover general equilibrium theory and welfare economics. A selection of both classical and contemporary material will be taught. Due to a lack of time, we shall prove only the most important results in class. The remainder will be stated and discussed.

Most of the material covered in this course segment was the product of research in the 1930’s, 40’s, 50’s and 60’s; it is older than you. If we progress fast enough, we will get into some material from the 1970’s. By asking questions, it is easy to get me to run off on tangents to talk about more recent work or the personalities involved in the work, but this can slow us down.

COURSE REQUIREMENTS

By the end of the course, you are expected to have an idea of the methods currently used in the areas of microeconomic theory covered by the course, as well as a picture of the state of the field. To this end, there will be two homework sets during this segment of the course. A closed book examination covering mainly the material in this segment of the course will be held in class on Wednesday, October 17, and will represent 80% of the grade for this half-semester. By closed book, I mean that you may not consult the text, your notes, or any other material, nor may you communicate with others while taking the exam. The homework will account for the remaining 20% of the grade. When combined with the second half of the course, the homework in this segment will account for 10% of the grade, whereas the exam on October 17 will account for 40% of the grade. The exam will be based primarily on homework and class notes, as opposed to the text or additional reading.

Regarding homework, you are encouraged to work together. It is perfectly fine to get an answer from somebody else, provided that you tried to do it yourself first. I expect those with better math training to help the other students. Regardless of how you come by your answer, you must write up the answer on your own. We want to be able to give you feedback on proper writing style, so that you are prepared to write well for tests (for example, the prelim). Some
of the homework questions will be challenging. In general, you don’t learn the material in more than a superficial way by attending lectures or reading the text. You learn the material in a substantial way through exercises.

A makeup exam will not be offered. Valid excuses for missing the exam include a verified illness or special family circumstances (e.g. death of a member of the immediate family). To be excused from the exam, you must give notification before the exam begins either to me or a department secretary. If you are excused, your course grade will then depend on your homework grade and on your performance in the other half of 503.

GENERAL HELP SESSIONS

General help sessions will be held Fridays during the remainder of the semester. These will be informal, and will be run by the assistant in instruction. Please bring questions. There will be a session in class on Wednesday, October 10, a week before the exam. I will run that session myself.

OFFICE HOURS

My office is located at 387 Seigle, my e-mail address is berliant@wustl.edu, and my phone is 935-8486. I am happy to answer questions via e-mail.

Office hours are Tuesdays 15:00 — 16:00 when there is a theory workshop that day, Wednesdays 1:00 — 2:00, and by appointment. In general, I’m happy to see you, unless I’m busy with urgent matters (generally pertaining to my role as DGS).

The assistant in instruction for the course is Weiting Hu. Office: Seigle 358; office hours: TBA; e-mail address: weiting.hu@email.wustl.edu

READINGS

The homework and exam will be based primarily on the lectures. The textbook for the course is:


Please use the text if I am unclear in class, or if you happen to miss a lecture. An advantage of the text is that it is rather comprehensive, so most topics can be found in it. A second advantage is that it uses consistent notation throughout. A disadvantage is that there are many errors1 and inconsistencies.

1It is actually incorrect to call them errors. The more accurate term would be lies, such as those told in undergraduate courses. The authors clearly knew what they were saying was incorrect, but said it anyway for the sake of simplicity.
A tentative lecture outline for the entire half-semester course follows.
A list of further readings on some of the topics follows the lecture outline. These readings are not required for this course, but are merely provided in case students are interested in learning more about the topics that we are studying only superficially in the allotted time. This list is by no means complete, but is only a subjective selection of some of the important work in each area. If you can’t find what you are looking for in the text, please try the readings listed under the appropriate topic.

Note: In the past, students have suggested that someone type up the course notes and post them on the course web site. This is a good and interesting suggestion as a substitute for a text. I experimented with it in this course several years ago. There are two issues, one major and the other minor. The major issue is that, in spite of our best efforts, there were errors in the notes. Even worse, they made their way into students’ exam answers. Big mess. The minor issue is that students often ask questions in class, leading to digressions or discussions of material I didn’t intend to cover. Thus, the notes are generally incomplete. If this material appears on an exam or homework, there are complaints.
LECTURE OUTLINE
[Numbers on the right indicate textbook chapters]

0. Organizational Matters

I. Introduction (or, The World According to Uncle Marcus)
   A. The Nature of Economic Theory
   B. Why is mathematics important?
   C. The Structure of Economic Theory
      1. Partial and General Equilibrium Theory
         [15.E]
      2. Welfare Economics and Market Failures
   D. Notation and Feasible Allocations
   E. The Edgeworth Box
      1. Exchange Economies
         [15.B]
      2. Production Economies
      3. Robinson Crusoe Economies
         [15.C]

II. Welfare Economics
    [10,15,16]
   A. Pareto Optimality
      1. Definition and Discussion
         [16.B]
      2. Utility Possibility Sets and Frontiers
         [16.E]
      3. Social Welfare Functions
         [21]
      4. Existence of Pareto Optima
         [16 Appendix A]
      5. First Order Conditions
         [16.F]
      6. Second Order Conditions
   B. Competitive Equilibrium
      1. Definition and Discussion
         a. Exchange Economies
         b. Production Economies
      2. First Order Conditions
3. Second Order Conditions

   1. Exchange Economies
   2. Production Economies


III. Core [18.B and Appendix A]

A. Definition and Discussion
B. Equilibrium Allocations are in the Core
C. Core Convergence
D. A Brief Survey of Other Important Topics
   1. Core Equivalence and Lyapunov’s Theorem
   2. The Bondareva-Shapley Theorem
   3. Scarf’s Theorem

IV. Existence of Competitive Equilibrium

A. Introduction
B. An Elementary Theorem for an Exchange Economy [17.C]
C. A General Theorem with Production [17 Appendix B]
D. Social Equilibrium — How a Competitive Equilibrium is Nash
E. The Argument of Negishi [17 Appendix A]
FURTHER READING

This list is clearly biased by my training and research experience. Free disposal is always an option. The list consists of (older) articles that you should be able to read after we cover the topic in class. In general, it would be wise to wait until you have taken more advanced courses to try to read more recent literature. In 503, we want you to focus on learning the basics well.

Classical books on general equilibrium theory and welfare economics:


A more recent and mathematically sophisticated text:


II. Welfare Economics


III. Core


Aumann, R.J., 1964, “Markets with a Continuum of Traders,” Econometrica 32, pp. 39-50. This is the first paper I read in mathematical economics. Truly awesome. A deep connection between cooperative game theory and general equilibrium theory.


IV. Existence of Competitive Equilibrium


Bergstrom, T., “How to Discard ‘Free Disposability’ — At No Cost,” *JME* 3, 1976, pp. 135-139. He used to be here!


