ECONOMICS 113 - MATHEMATICAL ECONOMICS: GENERAL EQUILIBRIUM THEORY

Preliminary – Subject to Revision

Requirements: There will be weekly problem sets, two midterms, a take-home portion of midterm 2 and of the final exam. Feel free to co-operate with friends and classmates on problem sets.

All examinations are open-book, open-notes. Confidentiality is required during examinations. Please strictly observe academic integrity. Examinations should be your own personal work. During examinations, other people (classmates, friends, professors -- except the TA and Prof. Starr) are CLOSED; do not discuss examination materials until after the exam has been collected.

Examination Schedule:

Midterm 1 (covers syllabus sections 1 to 3). In Class, date TBA, probably Thursday, January 21.

Midterm 2 (covers syllabus sections 1 to 7). In Class, date TBA, probably Thursday, February 18 and Take Home due TBA, probably Tuesday, February 23.

Final: There will be a take home section of the final exam, due date TBA. In-class final exam is scheduled for Thursday, March 18, 3:00p - 5:59p (subject to cancellation).

Grading: Problem sets, 5%; midterm 1, 15%; midterm 2, 30%; final exam, 50%. Additional credit for class participation.

Prerequisites: A year of calculus and a year of upper division microeconomic theory (at UCSD these courses are Math 20 A-B-C, and Economics 100A-B or 170A-B). The prerequisites may be taken concurrently. Students with very strong mathematics preparation (typically including one quarter of real analysis, UCSD Math 140A or 142A) may enroll without economics prerequisites.


Reserve Materials: The following items have been requested on reserve:
Arrow, K. J. and F. H. Hahn, General Competitive Analysis
Bartle, R., The Elements of Real Analysis , 1st edition, 1964
Cornwall, R. R., *Introduction to the Use of General Equilibrium Analysis*
Debreu, G., *Theory of Value*
Eatwell, J., M. Milgate, and P. Newman (eds.) *The New Palgrave: General Equilibrium*
Quirk, J. and R. Saposnik, *Introduction to General Equilibrium and Welfare Economics*
Starr, R. M., *General Equilibrium Theory: An Introduction*

**TOPIC OUTLINE**

Lectures will closely follow Starr's *General Equilibrium Theory: An Introduction*. Please read the relevant portion of Starr's *General Equilibrium Theory* before the topic is covered in class.

**Introduction and Mathematics**

1. The Brouwer Fixed Point Theorem and Existence of General Equilibrium in an N-commodity Economy (1 lecture)
   - Starr, chapter 5, preface to 1st & 2nd editions (frontmatter)
   - Optional: Arrow-Hahn, chaps.1, 2

2. The Edgeworth Box, Set Notation and N-Dimensional Euclidean Space (2 lectures)
   - Starr, chapters 3 and 7 (prior to section 7.1)
   - Optional: Bartle, Section 1, 7, 8, 11
   - Bartle and Sherbert, 2nd edition section 1.1, chap. 2, sections 3.1, 3.2, 3.3, chap.10; 3rd ed. section 1.1, chap. 2, sections 3.1, 3.4, 11.1, 11.2
   - Debreu, 1.2, 1.6, 1.9a - 1.9f
   - Carter, sections 1.1, 1.3, 1.3.1, 1.3.2

3. The Robinson Crusoe Model and Continuous Functions (2 lectures)
   - Starr, chapter 2 and section 7.1
   - Optional: Cornwall, 1.1, 1.2, 1.3
   - Bartle, Sections 2, 15
   - Bartle and Sherbert, 2nd ed., sections 5.1, 5.2, 5.3; 3rd ed. sections 5.1, 5.2, 5.3, 11.3
   - Debreu, 1.3, 1.8
   - Carter, sections 2.1, 2.1.1 & 2.3

**Midterm 1 will cover topics 1, 2, 3**
The Arrow-Debreu Model of Economic General Equilibrium

4. Representation of Commodities and Prices, Firms and Producers, Convexity (2 lectures)
   Starr, chap. 8 (except 8.3), 10, 11
   Optional: Debreu, Chapter 2, 3
   Quirk and Saposnik, 1.7, 2.1, 2.3
   Arrow-Hahn, Chapter 3
   Carter, 1.4.4

5. Households, Consumers (2 lectures)
   Starr, chaps. 12, 13
   Optional: Debreu, Chapter 4
   Cornwall, Section 1.4
   Quirk and Saposnik, 1.5, 1.6
   Arrow-Hahn, 4.1-4.3
   Varian, 7.1, 7.2

6. Brouwer Fixed Point Theorem (1 lecture)
   Starr, chap. 9
   Optional: Debreu, Section 1.10
   Nikaido, "Fixed Point Theorems" in *New Palgrave: General Equilibrium.*
   Carter, 2.4, 2.4.1, 2.4.4, 2.4.5

7. Equilibrium (2 lectures)
   Starr, chap. 1, 14
   Optional: Debreu, Chapter 5
   Cornwall, Section 1.6
   Quirk and Saposnik, 1.7, 2.1, 2.3
   Arrow-Hahn, Chapter 5
   Debreu, "Existence of General Equilibrium," *New Palgrave: General Equilibrium*
   McKenzie, "General Equilibrium," *New Palgrave: General Equilibrium*
   Varian, 17.1 - 17.5

Midterm Exam 2 based on topics 1 - 7

Welfare Economics

8. Fundamental Theorems of Welfare Economics and Separation Theorems (3 lectures)
   Starr, chapter 4, section 8.1, chapter 19
   Optional: Debreu, Section 1.9.v - 1.9.x, chap. 6
Cornwall, Sections 4.1, 4.2, 4.3, 4.5, 8.1.4
Quirk and Saposnik, 4.4, 4.5
Varian, 17.6, 17.7, 26.11

9. The Arrow Possibility Theorem (3 lectures)
   Arrow, Kenneth J., "A Difficulty in the concept of social welfare", Journal of
   Political Economy, 58 (1950), pp. 328 - 346. Reprinted in Arrow and Scitovsky,
   “Social Choice” by David Ahn
   “Kenneth J. Arrow (born 1921 - )” by R. Starr

Extending the General Equilibrium Model

10. Equilibrium over Time: Futures Markets (1 lecture)
   Starr, sections 20.1, 20.2

11. Constant Returns and U-Shaped Cost Functions (1 lecture)
   Additional notes TBA
   Optional: Starr chapters 23, 24, 25

The final examination will cover topics 1 through 11.