ECONOMICS 113 - INTRODUCTION TO MATHEMATICAL ECONOMICS: GENERAL EQUILIBRIUM THEORY

Preliminary – Subject to Revision

Teaching assistant: The course teaching assistant is ELAINE WONG, (e5wong@ucsd.edu). ELAINE is responsible for grading assignments and responding to e-mail inquiries. ELAINE and Prof. Starr will share responsibility for grading examinations.

e-mail: Please send e-mail to e5wong@ucsd.edu. Include 'Econ 113' in the subject line.

Requirements: There will be weekly problem sets, two midterms, and a take-home 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 ELAINE 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 5). In Class, Monday, April 24.
Midterm 2 (covers syllabus sections 1 to 11). In Class, Friday, May 19 and Take Home due Friday May 19.

Final: There will be a take home section of the final exam, due date TBA. In-class final exam is scheduled for Thursday, June 15, 11:30 a.m. - 2:30 p.m.

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 in the Geisel library:

Arrow, K. J. and F. H. Hahn, *General Competitive Analysis*


and 3rd edition, 2000

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. Approximate dates where topics will be treated in class appear below.

Scheduled holiday: Monday, May 29.

Introduction

1. The simplest general equilibrium model: Robinson Crusoe (April 3, 5, 7)
   Starr, 1.1, 1.2

2. The Edgeworth Box (April 10, 12)
   Starr, 1.3

3. A simple demonstration of existence of general equilibrium (April 14)
   Starr, 1.4
   “Kenneth J. Arrow (1921 - )” by R. Starr
   Optional: Arrow-Hahn, chaps.1, 2
   Cornwall, 1.1, 1.2, 1.3
   Geanakoplos, John, "Arrow-Debreu Model of General Equilibrium" in
   *The New Palgrave: General Equilibrium*
   Varian, 17.1 - 17.5

Mathematics

4. Set notation, Euclidean N-dimensional space, $\mathbb{R}^N$ (April 17, 19)
   Starr, 2.1 "Set Theory"
   Starr, 2.4 "$\mathbb{R}^N$, Real N-dimensional Euclidean Space"
   Optional: Bartle, Section 1, 7, 8, 11
5. Continuous Functions (April 21)
   Starr, 2.3 "Functions,"
   2.5 "Continuous Functions"
   Optional: Bartle, Sections 2, 15
   Bartle and Sherbert, 2nd ed., 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

Midterm 1: Monday April 24

6. Convexity (April 26)
   Starr, 2.6 "Convexity"
   Optional: Debreu, Section 1.9

The Arrow-Debreu Model of Economic General Equilibrium
7. Representation of Commodities and Prices (April 28)
   Starr, chap. 3
   Optional: Debreu, Chapter 2

8. Firms, Producers (May 1, 3)
   Starr, chap. 4
   Optional: Debreu, Chapter 3
   Quirk and Saposnik, 1.7, 2.1, 2.3
   Arrow-Hahn, Chapter 3

9. Households, Consumers (May 5, 8, 10)
   Starr, chaps. 5, 6
   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

10. Brouwer Fixed Point Theorem (May 12)
    Starr, 2.7 "Brouwer Fixed Point Theorem"
    Optional: Debreu, Section 1.10
    Nikaido, "Fixed Point Theorems" in New Palgrave: General Equilibrium.

11. Equilibrium (May 15, 17)
Starr, chap. 7
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*

**Welfare Economics**

12. Separation Theorems (May 22)
   Starr, 2.8 "Separation Theorems"
   Optional: Debreu, Section 1.9.v - 1.9.x
   Cornwall, Section 8.1.4
   Varian, 26.11

Memorial Day Holiday, Monday, May 29

13. Fundamental Theorems of Welfare Economics (May 24, 26, 31)
   Starr, chap. 12
   Optional: Debreu, Chapter 6
   Cornwall, Sections 4.1, 4.2, 4.3, 4.5
   Quirk and Saposnik, 4.4, 4.5
   Varian, 17.6, 17.7.

   Readings TBA

**Extending the General Equilibrium Model**

15. Equilibrium over Time: Futures Markets (June 2)
   Starr, 15.1 "Introduction", 15.2 "Time: Futures Markets"

16. Constant Returns and U-Shaped Cost Functions (June 5)
   Starr, 16.7 "Kakutani Fixed-Point Theorem"
   Additional notes TBA

17. Who Needs Economic Theory Anyway? (June 7, 9)