ECONOMICS 113 - MATHEMATICAL ECONOMICS: 
GENERAL EQUILIBRIUM THEORY 

January 2, 2012 
Preliminary, Subject to Change, 

Requirements: There will be weekly problem sets, two midterms, a take-home portion 
of midterm 2, a final exam including a take-home portion 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 Isla 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, Friday, January 27. 

Midterm 2 (covers syllabus sections 1 to TBA). There will be a brief take-home 
midterm on the web, Wednesday, February 22, due Friday, February 24. There will be an 
in-class midterm on Friday, February 24. 

Final Exam: There may be a take-home portion of the final exam. The in-class 
final exam is scheduled for Monday, March 19, 3:00p - 5:59 PM. 

Grading: Problem sets, 5%; midterm 1, 15%; midterm 2, 30%; final exam, 50%. 

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). 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. 


Lecture Notes on the Web: Prior to each lecture prepared notes for the lecture will be 
available on the web. Please have these notes available, and ready for your additional 
annotation, while you attend the lecture. 

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

Carter, Michael, Foundations of Mathematical Economics, 2001

Ok, Efe A., Real Analysis with Economic Applications, 2007

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


Varian, H., Microeconomic Analysis, 3rd ed., 1992

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 Edgeworth Box (1 lecture)
   Starr, ‘Frontmatter’: preface to 1st & 2nd edition, Foreword, Starr, Chap. 1, 3
   Optional: Arrow-Hahn, chap. 1

2. Set notation and N-dimensional Euclidean Space (1 lecture)
   Starr, Chap. 6, 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 (1 lecture)
   Starr, chapter 2
   Optional: Cornwall, 1.1, 1.2, 1.3

4. Continuous Functions (2 lectures)
5. The Brouwer Fixed Point Theorem, Convex Sets, and Existence of General Equilibrium in an N-commodity Economy (3 lectures)
   Starr, chapters 5, 8 (prior to section 8.1)
   Optional: Arrow-Hahn, chaps. 2
   Carter, 1.4.4

Midterm 1 (on January 27) will cover topics 1, 2, 3, 4, 5.

The Arrow-Debreu Model of Economic General Equilibrium

6. Representation of Commodities and Prices, Firms and Producers, (3 lectures)
   Starr, chaps. 10, 11
   Quirk and Saposnik, 1.7, 2.1, 2.3
   Arrow-Hahn, Chapter 3

7. Households, Consumers (3 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

8. 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

9. Equilibrium (3 lectures)
   Starr, chap. 14, 15, 16, 17,18.
   Optional: 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 - 9**. Subject to revision.

**Welfare Economics**

10. 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,
   
   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

11. The Arrow Possibility Theorem (3 lectures)
   
   
   
   
   Sen, Amartya, “Arrow and the Impossibility Theorem” on the web.

**Extending the General Equilibrium Model**

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

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

**The final examination will cover topics 1 through 13.**