Economics 113   Prof. R. Starr
UCSD   Winter 2012

Prof. Ross Starr   rstarr@weber.ucsd.edu, (858) 534-3879
Teaching Assistant: Ms. Isla Globus-Harris, iglobush@ucsd.edu

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.

Text: R. Starr's *General Equilibrium Theory: An Introduction,* Second Edition.

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*

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, eds.,
        Readings in Welfare Economics, 1969.
Bartle, R., *The Elements of Real Analysis* , 1st edition, 1964
Bartle, R. and D. R. Sherbert, *Introduction to Real Analysis* , 2nd edition, 1992 and 3rd
        edition, 2000
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*
Gibbard, A. and H. Varian, "Economic Models" *Journal of Philosophy*, v. 75, 1978, pp.
        664-677.
McCloskey, D. "The Futility of Blackboard Economics" in *The Vices of Economists--The
        Virtues of the Bourgeoisie*, Amsterdam University Press, 1996.
Quirk, J. and R. Saposnik, *Introduction to General Equilibrium and Welfare Economics*
Starr, R. M., *General Equilibrium Theory: An Introduction, 2nd edition, 2011*
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)

Starr, section 7.1
Optional: 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

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
       Optional: Geanakoplos "Arrow-Debreu Model of General Equilibrium" in *New
Palgrave*.
              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)
    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, eds., Readings in Welfare Economics, 1969.
    "Kenneth J. Arrow (born 1921)" by R. Starr, in the *New Palgrave Dictionary of EconomicsOnline*, available on the web from the UCSD library.
    Sen, Amartya, "Social Choice" in the *New Palgrave Dictionary of EconomicsOnline*, available on the web from the UCSD library.
    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.