Joel Sobel Winter 2006

## Economics 208: Games and Information

### General:

This course will meet on Monday and Wednesday from 10:00 to 11:20 in 300 Economics. I will have office hours after class in 311 Economics.

#### **Contact information:**

email: jsobel@ucsd.edu phone: 858.534.4367 web page for class material:

http://www.econ.ucsd.edu/%7Ejsobel/208.html

## **Prerequisites and Expectations**

The class is an advanced introduction to game theory. I will assume familiarity with the basic concepts (obtained from Econ 200C, for example).

The material is theoretical. 200C should be sufficient background in microeconomics. Mathematical sophistication at least at the level of an intermediate undergraduate analysis course (Math 140) would be valuable.

The course should provide a deeper introduction to game theory than provided in the core; give students interested in working in topics that use game theory sufficient experience with basic ideas to follow game theoretic arguments in the literature, identify slimy modeling techniques, and solve their own games; and cover enough work at the "frontier" to suggest possible research problems.

The lectures will introduce important concepts and illustrate the most important proof techniques. Students will not master the material without working (hard) on (hard) problems.

#### **Requirements and Grading:**

I expect four things:

- 1. Students should do the readings and come to class prepared to ask and answer questions. To encourage participation I may designate that a subset of students are responsible for asking and answering questions about specific lecture material.
- 2. Students should complete several problem sets, which can be done in groups.
- 3. In pairs (if the enrollment is even), students should make a one-hour presentation of course material. Students should see me as soon as possible to discuss potential topics and relevant reading.

4. Students should write a short (no more than ten pages) paper. I would like the paper to pose and (ideally) solve a substantive game theoretic problem. That is, I want you to aspire to something more like a research paper than a literature review.

I will aggregate your performance in the categories above in order to assign a final grade. I will try to provide useful evaluations shortly after any assignment.

## Books

The main reference for the course is:

(FT) D. Fudenberg and J. Tirole, Game Theory, MIT, 1991.

(FT) is the standard graduate resource for the course material. It should be available at fine bookstores everywhere. An alternative general reference is:

(OR) M. Osborne and A. Rubinstein, A Course in Game Theory, MIT, 1994.

In addition, the bookstore should have copies of

(K) V. Krishna, Auction Theory, Academic Press, 2002

and

(M) P. Milgrom, Putting Auction Theory To Work, Cambridge, 2004.

These books are good references on auction theory, which will be the topic of the last part of the class.

#### **Topics and Readings**

The listing below provides a rough guide to the order of topics and the basic reading. I will provide more detailed references and a clearer road map on a topic-by-topic basis.

1. Complete Information

(a) Dominance and Rationalizability

(FT) Chapter 1.1, 2.1

(OR) Chapter 4

- (b) Nash Equilibrium and Its Properties
  - (FT) Chapter 1.2, 1.3
  - (OR) Chapter 2
- (c) Correlated Equilibrium
  - (FT) Chapter 2.2
  - (OR) Chapter 3.1, 3.3

- (d) Higher Order Beliefs and Common Knowledge
  - (FT) Chapter 14
  - (OR) Chapter 5  $\,$
- (e) Dynamics and Justifications for Equilibrium (OR) Section 3.4
- (f) Refinements(FT) Chapters 8.4, 11.1(OR) Chapter 12.5
- 2. Dynamic and Repeated Games
  - (a) Introduction(FT) Chapter 3(OR) Chapter 6
  - (b) Folk Theorems(FT) Chapter 4.3, 5.1-3(OR) Chapter 8
  - (c) Bargaining(FT) Chapter 4.4(OR) Chapter 7

# 3. Bayesian Games

- (a) Perfect Bayesian and Sequential Equilibrium
  (FT) Chapter 6.1-4
  (OR) Chapter 11-12
- (b) Purification(FT) Chapter 6.7(OR) Chapter 3.2
- (c) Signaling(FT) Chapter 8
- (d) Reputation (FT) Chapter 9
- 4. Auctions and Mechanism Design [specific references to follow]
  - (a) Positive Analysis of Auctions and Revenue Equivalence
  - (b) Optimal Auctions
  - (c) Myerson-Satterthwaite Theory
  - (d) Multi-Unit Auctions