This is the second semester course in the PhD sequence in microeconomics. The class addresses information and incentives in economic problems.

**Course Texts:** *Microeconomic Theory*, by Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green (Oxford University Press). Material on game theory will also be drawn from *A Course in Game Theory* by Martin J. Osborne and Ariel Rubenstein (MIT Press). Additional reading assignments will be drawn from original sources.

**Appointments:** Please arrange an appointment to meet with me in my office by sending me an email.

**Grading:** Your grade will be based upon one midterm and a final exam. The midterm will be on March 18. The two exams will count equally in determining your course grade.

Problems will routinely be assigned for review in class and in your TA section. These assignments will not be graded. The course is mainly about learning to solve problems, however, and so a serious effort on the assignments is expected. You are advised to take full advantage of the services provided by our TA in the weekly sessions. The assigned problems and the TA sessions provide the best preparation for the exams that determine your grade.

**Attendance:** You are responsible for all material covered in class and all announcements made during class time concerning course procedures.

**Course Materials:** All materials posted on the course web page (including the exams) are intended purely for your use as a student in the course. Please do not distribute or reuse any course materials without my permission.
Course Outline

Tentative: This outline will be updated as we proceed through the course.

1. Basic Elements of Noncooperative Games (Ch. 7 of M-C,W,G)
   (a) Extensive Form Representation of a Game
   (b) Strategies and the Normal Form Representation of the Game
       i. strategy sets, outcome sets, outcome mapping

2. Simultaneous-Move Games (Ch. 8 of M-C,W,G)
   (a) Dominant and Dominated Strategies
   (b) Iterative Deletion of Strictly Dominated Strategies
   (c) Mixed Strategies
   (d) Rationalizable Strategies (8.C)
   (e) Nash Equilibrium (sec. 8.D)
       i. Discussion of the Concept of Nash Equilibrium (p. 248)
       ii. Mixed Strategy Nash Equilibria
       iii. Why should we expect the players to play a Nash equilibrium?
   (f) Games of Incomplete Information: Bayesian Nash Equilibrium
   (g) The Possibility of Mistakes: Trembling Hand Perfection

3. Dynamic Games (Ch. 9 of M-C,W,G)
   (a) Sequential Rationality, Backward Induction, and Subgame Perfection
       i. history, subgame, equilibrium path
       ii. The Centipede Game (Rosenthal)
   (b) finitely repeated normal form game
   (c) Beliefs and Sequential Rationality
       i. Problems with the Weak Perfect Bayesian Equilibrium Concept
       ii. Off the equilibrium path beliefs – should they be "sensible" in some way?
       iii. Strengthening the Weak Perfect Bayesian Solution Concept
           A. sequential equilibrium
   (d) Reasonable Beliefs and Forward Induction
   (e) Appendix A: Finite and Infinite Horizon Bilateral Bargaining
   (f) Repeated Games and the Folk Theorem
4. Mechanism Design
   (a) The Gibbard-Satterthwaite Theorem
   (b) Arrow’s Impossibility Theorem
   (c) Maskin’s Theorem on Nash Implementation
   (d) The VCG mechanism
      i. Groves and Loeb, "Incentives and Public Inputs"

5. March 18: Midterm exam.

6. Auctions
   (a) Matthews, "A Technical Primer on Auction Theory I: Independent Private Values"
   (b) Holmstrom and Myerson’s taxonomy of efficiency and constraints in problems with incomplete information
      i. “Efficient and Durable Decision Rules with Incomplete Information”
   (c) Myerson’s "Optimal Auction Design"
   (d) Optimal auctions in the regular case

7. R. Myerson and M. Satterthwaite, "Efficient Mechanisms for Bilateral Trading"
   (a) S. R. Williams, “A Characterization of Efficient, Bayesian Incentive Compatible Mechanisms”

8. Matching
   (a) Gale-Shapley Algorithm
   (b) Kidney Exchange

9. Networks
   (a) Jackson and Wolinsky, "A Strategic Model of Social and Economic Networks"

10. Double Auctions
    (a) M. A. Satterthwaite and S. R. Williams, “The Bayesian Theory of the k-Double Auction”
    (b) M. A. Satterthwaite and S. R. Williams, “The Rate of Convergence to Efficiency in the Buyer’s Bid Double Auction as the Market Becomes Large”
Readings

This list will be amended as we proceed through the course.


M. A. Satterthwaite and S. R. Williams, “The Bayesian Theory of the k-Double Auction,” by M. A. Satterthwaite and S. R. Williams, in *The Double Auction Market: Institutions, Theories, and Evidence*, D. Friedman and J. Rust,


