Lones Smith Fall (2002)

Game Theory (Econ 617)

This is an advanced course in game theory. It assumes that your prior knowledge of game theory x and your analytical ability y obey the inequality $xy > c$, where $c > 0$ is a constant that I cannot quantify. The idea is that this is a sequel to Econ 602, but I will not enforce that rule, since your y may be high, or you may x may owe to other sources, like seeing "A Beautiful Mind" (I hope not).

The grade comes from three or four assignments, and a take-home one day final. Assignments count about 15% each (some may be more, some less) and the final 40%. If we cannot agree on a common day for the take home, it will be due the day of the scheduled final exam (or if it is not scheduled, when it would have been).

The course text is *Game Theory* by Fudenberg-Tirole. It should (soon) be in Ulrich's bookstore, as well as on reserve in Foster, along with the texts by Myerson, Osborne-Rubinstein. For those whole prefer intuition, or enjoy reading, enjoy the math-less book *The Strategy of Conflict* by Schelling (also on reserve in Foster); he managed to anticipate many of the ideas in game theory in the 1980's about two decades earlier. Here are some of my favourite snippets from his classic book when I read it several years ago:

- "strategy ... is not concerned with the *application* of force but with the *exploitation of potential force.*
- "Deterrence: influencing the choices another party will make by influencing his expectations of how we will behave."
- "... most conflict situations are essentially bargaining situations."
- "... madmen, like small children, can often not be controlled by threats."

I. Noncooperative Strategic Solution Concepts and Fundamentals

A. Normal Form Games

1. Rationalizability
   - Bernheim (1982) and Pearce (1982)
   - Supermodularity
2. Nash Equilibrium and Trembling Hand Perfection
   - Minmax theorem for zero-sum games, and computing odds for casino games
   - Not Covered: Experimental Game Theory
   - Maybe covered: Coalition-proofness
   - Just Touched on: Cooperative Game Theory concepts
3. Incomplete Information and Bayes Nash Equilibrium
   - Omitted topic: Universal Belief Spaces
   - Harsanyi Purification of Randomized Strategies

B. Extensive Form Games

- Kuhn's Theorem and perfect recall (maybe Rubinstein's absent-minded driver paradox)

1. Subgame Perfect Equilibrium
   - Omitted topic: the backward induction paradox
   - Subgame Perfect Implementation: Rubinstein-Wolinsky
2. Sequential Equilibrium
   - Kreps-Wilson (1982)
   - Observable actions and Perfect Bayesian Equilibrium
   - Chain store paradox and Reputation
3. Further Refinements
   - Strategic Stability of Normal Form Games: Kohlberg-Mertens (1986)
   - Signaling Games and the Intuitive Criterion: Cho-Kreps (1986)

C. Common Knowledge and Equilibrium

- Knowledge operators and the Emperor's New Clothes
- Impossibility of Agreeing to Disagree: Aumann (1976)
- Speculation and No-Trade Theorems: Milgrom-Stokey (1982)
- Almost Common Knowledge and the Email game: Rubinstein (1989)

D. Communication and Equilibrium

- Mediated Communication via Correlated Equilibrium: Aumann (1974)
- Mechanism Design with Linear Utility: Myerson (1981)
- Sender-Receiver games: Crawford-Sobel (1982)
- Cheap Talk games: Aumann-Hart (2002)

E. Learning and Equilibrium

- Self-Confirming Equilibrium: Fudenberg-Levine (1993?)
- Fictitious Play: Shapley (1954)
- Not Covered: Evolutionary Game Theory
- Not Covered: Complexity Theory

II. Topics in Stochastic Games

A. Foundations

- Stochastic Games and Subgame Perfect Equilibrium
- Markovian Equilibrium
- Touched on: Continuous-Time Repeated Games: Bergin-MacLeod (1993)

B. Dynamic Games with Endogenous Termination

- Rubinstein's (1982) Bargaining Model
- Simple Timing Games
- Morphing between WoA and Pre-emption Games: Park-Smith (2002)
- Aspirational Bargaining: Smith-Stacchetti (2002)

C. Exogenously Repeated Games with Complete Information

- Undiscounted Repeated Games and the Folk Theorem
- Discounted Repeated Games with Perfect Information - Abreu (1988)
- Folk Theorem for Infinite Horizon Games: Fudenberg-Maskin (1986), Abreu et al (1994)
- Folk Theorem for Finitely Repeated Games: Benoit-Krishna (1985)
- Folk Theorem for OLG and Random Matching Games: Smith (1992), Kandori (1992?)
- Not Covered: Renegotiation-proofness
- Imperfect Information - Abreu at al (1986/90)
- Folk Theorem of Fudenberg et al (1994)
- Private Monitoring: private notes on the last frontier

D. Dynamic Games with Incomplete Information

- Repeated coordination games: Crawford-Haller (1988)
- incomplete information WoA (the governing theme without coordination)
- Reputation in Repeated Games with a Long Run and Short Run Player
- Bad Reputation: Ely-Valimaki (2002)
- Reputation in Bargaining: Myerson (1991), Abreu-Gul (2001?)
- Bargaining with Incomplete Information
- Durable Monopoly and the Coase Conjecture: Gul et al (1986)
- Undiscounted Repeated Games of Incomplete Information: Aumann-Maschler (1966)