POLI 204C
Game Theory

Winter 2011
Tue 9:00–11:50a
SSB 104

http://polisci.ucsd.edu/slantchev/courses/gt/

Professor Branislav L. Slantchev
Office: SSB 387
Office Hours: Tuesday afternoons
E-mail: slantchev@ucsd.edu

DESCRIPTION: Non-cooperative game theory is an abstract framework for analyzing strategic situations that involve multi-person interdependent decision making. Conflict, cooperation, coordination, bargaining, auctions, and (tacit) communication are all topics that can be usefully analyzed within this framework.

This graduate course will teach the fundamentals of game theory. It will be a rigorous introduction that does not shy away from technical detail but that emphasizes modeling issues and solution concepts. Game theory emerged as a branch of applied mathematics and is still quite mathematical. Although we shall rarely use more than algebra, the course will be analytically demanding. The hard part of game theory is not the math but the logic, and mastering this takes time and effort. There are no formal prerequisites for this course, but mathematical thinking will be indispensable.

REQUIREMENTS: There will be numerous problem sets, roughly one every week, and they will expand on the lectures. Some of the solutions will be covered in class, and all solutions will be posted on the website. Your final grade will be determined from a final comprehensive exam (55%), and the problem sets (45%). The exam will be 24 hours take-home. You will be allowed to consult your notes only. You will not be allowed to discuss the problems with any of your colleagues or consult any other resources, including, but not limited to material available online.

GUIDELINES: If you intend to do well in this course, follow these guidelines closely:

1. **Do all problems assigned for homework.** I cannot emphasize this strongly enough. If you have questions or if you get stuck, come and see me, and we shall go through the steps together. The problem sets are far more useful to you as opportunities to learn than they are to me as grading tools.

2. **Do not work in groups.** I strongly discourage you from working in groups. Students ignore this advice at their own peril. Invariably, working in groups results in the few people who understand the material doing everything with the rest free-riding.

3. **Budget your time and effort.** Game theory *will take time* and *will take a lot of effort*. Do not even think about doing the problem sets the night before they are due. Spread your work so that you are doing something almost every day of the week.

4. **Do not get frustrated.** You will find that despite your best efforts a solution may evade you. You will find that you are not sure about the solution. You will find that you do not even know where to begin or where to go. These are all normal parts of the learning experience. Learning game theory will be full of them. Expect it.

READINGS: This course is primarily taught from lecture notes that are available online. I strongly encourage you to acquire the following books to supplement these.

- Drew Fudenberg and Jean Tirole. 1991. *Game Theory.* Cambridge: The M.I.T. Press. A comprehensive literature review that may be too terse without enough background but that is unsurpassed in scope and detail. If you are serious about formal theory, you must own this book.
- Roger B. Myerson. 1991. *Game Theory: Analysis of Conflict.* Cambridge: Harvard University Press. A truly rigorous, comprehensive, but very readable coverage of game theory. By far the best in detail, clarity, and usefulness. Serious students will probably want to read this one in conjunction with Fudenberg & Tirole.
- Robert Gibbons. 1992. *Game Theory for Applied Economists.* Princeton: Princeton University Press. A very intuitive and well-explained coverage of the most common solution concepts.
- Martin J. Osborne. 2003. *An Introduction to Game Theory.* New York: Oxford University Press. For those who prefer a gentler introduction, at a much slower pace, with plenty of examples. Uses non-standard notation though.
- Gintis, Herbert. 2000. *Game Theory Evolving.* Princeton: Princeton University Press. A remarkable book exemplifying the new low-rationality approach to game theory. Plenty of examples, many of them worked out.

SCHEDULE: This is a list of topics we shall try to cover. We may not be able to get to the special topics but we shall keep pretty closely to the schedule to avoid falling behind and not having enough time for the quite involved incomplete information games.

TOPIC 1: REVIEW: PROBABILITY THEORY, FORMAL LOGIC, SETS

TOPIC 2: DECISION-THEORETIC FOUNDATIONS

TOPIC 3: ELEMENTS OF BASIC MODELS

TOPIC 4: STRATEGIC FORM: DOMINANCE, NASH EQUILIBRIUM, SYMMETRY

TOPIC 5: PERFECT EQUILIBRIA IN EXTENSIVE FORM GAMES

TOPIC 6: INCOMPLETE INFORMATION IN STATIC AND DYNAMIC SETTINGS

TOPIC 7: REPEATED GAMES AND FOLK THEOREMS