POLI 203B
Analytic Theory II

Winter 2020
TTh 9:30–10:50a
SSB 104

slantchev.ucsd.edu/courses/ps203b/

Professor Branislav L. Slantchev
Office: SSB 364
Office Hours: use signup sheet
E-mail: slantchev@ucsd.edu

DESCRIPTION: This is the second course in the Analytic Theory sequence whose overall objective is to provide conceptually clear foundations of political theory to graduate students. This course focuses on non-cooperative game theory and continues where the first one left off. Non-cooperative game theory is an abstract framework for analyzing strategic situations that involve multi-person interdependent decision making. Conflict, cooperation, coordination, collective action, bargaining, auctions, and (tacit) communication are all topics that can be usefully analyzed within this framework. We shall study the fundamentals of game theory and canonical applications across subfields in political science and economics. Throughout, we shall adopt the perspective that formal models are tools for conceptual exploration and building blocks for theories that are amenable to empirical testing rather than hypothesis-generating devices themselves. We shall also scrutinize the limits of this framework to see when its application is appropriate.

PREREQUISITES: You must have successfully completed *POLI 203A: Analytic Theory I* or its equivalent (with prior authorization).

REQUIREMENTS: The course grade will be determined from a midterm exam (during week 6, 30%), a cumulative final exam (during finals week, 45%), and problem sets (roughly biweekly, 25%).

EXAMS. Both exams are in class, and do not permit consultation with other students, or the use of any resources, included but not limited to the textbook, notes (including yours), and material found online. You will only be allowed to to have your paper and pens out of your bags in the classroom.

MISSED EXAMS. Make-up exams will only be given under valid, documented, and extreme circumstances. If you know you are going to miss an exam for a legitimate reason, notify me immediately (e-mail is acceptable). It is your responsibility to arrange for a make-up.

HOMEWORK. All problem sets must be typeset and submitted in PDF format via e-mail to me by noon on the day they are due. (You can write graphical matter by hand but must append it to the submission.) A submission received after the solutions are posted online will not be accepted for credit. Problem sets are *self-graded*: you will assess your own work using the solutions and guidelines I will give you. You will submit a graded hardcopy (which must match the electronic submission) in class on the due date. This is the only way to get credit for your homework.

ATTENDANCE. Class attendance is mandatory. Missing more than 5 meetings without a sanctioned excuse will result in failing the course irrespective of other factors.

ELECTRONIC DEVICES. No electronic devices will be permitted in class unless there is a University-sanctioned exemption.

ACADEMIC INTEGRITY. You are expected to do you own work. Students suspected of cheating (this includes, but is not limited to, presenting other people's solutions as their own, working with colleagues and then submitting common solutions, or using any materials during exams) will be immediately turned over to the Academic Integrity Office. If it is determined that a violation of academic integrity standards has occurred, the student will fail the course, and AIO may impose additional administrative sanctions, including suspension and termination from the program.

GRADE APPEALS. You can expect to be graded solely on your academic performance. Students who believe to have received an incorrect grade or a grade based on non-academic criteria should formally appeal it to me. The appeal will consist of a single typed page that identifies the problem and presents a reasoned argument explaining why the grade needs to be revised.

GUIDELINES: While the course does not shy from technical detail, it strives to convey the logic of the arguments and the intuition behind the results. We shall rarely use anything more advanced than college algebra. The course is nevertheless analytically demanding. The difficult part of game theory is not the mathematics (at least not in this course), but the intricacies and nuance of strategic interaction. This is best learned through doing rather than reading, and students should be prepared to invest significant effort and time in this course. Students often find that even when they are perfectly capable of following the lectures, they have trouble solving models by themselves. As with every profound idea, most results in game theory are obvious *once the model has been set up, once its logic is followed through*, and *once its abstract results are applied to the substantive problem*. All three components involve a lot of intuition that can only be developed with practice. There are no cookie-cutter recipes that one can apply to every model. The "art" side of game theory cannot be taught, it can only be acquired. 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. If you do get stuck and for some reason cannot see me, go ahead and consult with your colleagues but beware of how much help you are getting, and make sure that you can do the problem on your own.

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 and from the Tadelis *Game Theory* textbook, which you should have already acquired when you took the first course. If you are at all serious about learning formal modeling, I encourage you to acquire the following books:

- 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.

- 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.

TOPIC 1: REVIEW: STATIC GAMES OF COMPLETE INFORMATION

- Nash equilibrium
- Symmetric games
- Canonical mixed-motive games of conflict and cooperation
- Interpretations of mixed strategies

TOPIC 2: REVIEW: MULTI-STAGE GAMES OF COMPLETE INFORMATION

- Counterfactual reasoning
- Backward induction and subgame perfection
- Sophisticated voting and agenda control
- Self-enforcing agreements
- Paradoxes of rationality

TOPIC 3: REPEATED GAMES AND FOLK THEOREMS

- Finitely repeated games
- Principle of optimality
- Infinitely repeated games with discounting
- Tit-for-Tat and credibility
- Institutions as equilibria

TOPIC 4: STRATEGIC BARGAINING

- Rubinstein alternating-offers model
- Inside and outside options
- Bargaining in legislatures
- Breakdown as a result of commitment problems

TOPIC 5: STATIC GAMES OF INCOMPLETE INFORMATION

- Harsanyi transformation
- Bayesian Nash equilibrium
- Purification theorem
- Market failures
- Principal-agent problems: moral hazard and adverse selection
- Swing voter's curse

TOPIC 6: DYNAMIC GAMES OF INCOMPLETE INFORMATION

- Sequential rationality and consistent beliefs
- Weak Perfect Bayesian Equilibrium
- Signaling and intuitive criterion
- Reputation
- Cheap talk