POLI 204C: Introduction to Game Theory
Spring 2015

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Course Description

This course is a rigorous introduction to the basic concepts and logic of noncooperative game theory. We will focus on modeling issues and solution concepts. Some familiarity with first-order logic and basic set theory will be essential. The course requirements will not assume mathematical proficiency beyond basic algebra (and maybe some differential calculus).

Course Texts

Lectures will mostly draw on the following texts. The first is available from the UCSD bookstore. (The third provides crucial background for the course. You should get a copy.)

1. Tadelis, *Game Theory* (Princeton UP, 2013)
2. Watson, *Strategy* (Norton, 3rd ed. 2013)
3. Velleman, *How To Prove It* (Cambridge UP, 2006)

Whether you grasp the salient intuitions behind a concept often depends on how the concept is presented to you. So it is worth checking out other texts for the sake of comparison. Here are some helpful ones.

1. Fudenberg and Tirole, *Game Theory* (MIT Press, 1991)
2. Gibbons, *Game Theory for Applied Economists* (Princeton UP, 1992)
3. Gintis, *Game Theory Evolving* (Princeton UP, 2nd ed. 2009)
4. McCarty and Meirowitz, *Political Game Theory* (Cambridge UP, 2007)
5. Rasmusen, *Games and Information* (Blackwell, 4th ed. 2007)
6. Williams, *Introduction to Game Theory: A Behavioral Approach* (Oxford UP, 2013)

Class Policies

1. Electronic devices (laptops, tablets) are prohibited. Any cell phone that is pulled out during class must be placed face-down on the desk for the remainder of class (excepting emergencies, of course).
2. All submissions must be typeset — preferably LaTeX, Word accepted — and a hardcopy submitted at the agreed upon time. (I've linked a comprehensive guide to LaTeX symbols on the course materials page.) Handwritten problems sets will be returned ungraded.
3. Late submissions will accrue a 2 point penalty for every 24 hour period that lapses, starting at 16:00 on the due date.
4. Group work. You are permitted to work together when solving problem sets (sorting out solution strategies, doing scratch work, etc.). However, you are prohibited from submitting jointly written answers — *all submissions must be independently written.* In addition, the first paragraph of each problem set submission must (a) enumerate the other students with whom you worked on the solutions, and (b) give a rough indication of the group members' relative contribution to the solutions. Please note carefully: it is in your interest that you not rely too heavily on others; make sure you have a firm grasp of the logic of the answers. The problem sets are meant to be training exercises for the exams; you will do well on the exams *if and only if you understand the logic of the problem set solutions.*
5. Academic misconduct (e.g., see last item) will be vigorously prosecuted. The academic sanction is an automatic F for the course. The administrative sanction (e.g., suspension, termination) will be determined by the UCSD Academic Integrity Office upon their review of the incident.

Assessment

Do not allocate your effort to maximize your grade; allocate your effort to maximize your understanding.

Your final grade is a function of your performance on some (as-yet unspecified) number of problems, distributed across problem sets and exams. Let s_i be student i's overall score for the term.

$$s_i = \frac{3}{5}[\text{Problem sets score}] + \frac{1}{5}[\text{Midterm score}] + \frac{1}{5}[\text{Final score}]$$

Scoring for a single problem. Each problem (whether on a problem set or exam) is graded on a 4 point scale.

Score	Interpretation
3	Fully meets expectations
2	Mostly meets expectations
1	Partly meets expectations
0	Serious flaws

I won't give detailed comments, but I will clearly indicate where any problems lie. It's up to you to talk to me if you need further clarification about your grade or help understanding particular problems.

Calculating your final grade. Let p denote the total number of problems assigned in problem sets, q denote the number of problems on the midterm, and r the number of problems on the final exam. The highest possible overall score is

$$T = \frac{3}{5}3p + \frac{1}{5}3q + \frac{1}{5}3r.$$

For $n \in \mathbb{N}$ s.t. $n \leq 10$: if $s_i \geq \frac{n}{10}T$, then i gets A+ less $(10-n)$ steps.

Substantive interpretation: For a given n, i meets at least the following standard: i scores some $\phi \in \{1,2,3\}$ on at least x% of problems and scores $\phi - 1$ on $[100-x]$% of problems, subject to $x \in [0,100]$.

Figuring out your letter grade given n is easy enough. I leave it as an exercise for students to solve for x—either for each n (generate a table) or for the general case. (Hint: x is a function of ϕ and n. If solving for a particular n, make sure you choose ϕ so that $x \in [0,100]$.) The solution is available on the course website.

Rough Schedule

Subject to change.

Weeks 1/2 (Expected) Utility theory (Tadelis, part 1)

Problem set 1

Weeks 2/3 Model basics (Tadelis, chs. 3, 6 & 7; Watson, chs. 1–5)

— *Games with complete information* —

Weeks 3/4 Static (Tadelis, chs. 4–6; see also: Watson, chs. 6–11)

>Dominance, Nash equilibrium

Problem set 2

Weeks 5/6 Dynamic (Tadelis, chs. 8–11; see also: Watson, chs. 14–15)

>Subgame perfect equilibrium

Problem set 3

Midterm exam

— *Games with incomplete information* —

Weeks 7/8 Static (Tadelis, ch. 12)

>Bayesian Nash equilibrium

Problem set 4

Weeks 9/10 Dynamic (Tadelis, chs. 15–17; see also: Gibbons, ch. 4)

>Perfect Bayesian equilibrium, sequential equilibrium

Problem set 5

Final exam