17.810/17.811: Game Theory and Political Theory

Fall 2017

Instructor: In Song Kim

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Contact Information

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Office Hours:	Th 4:00pm-6:00pm	M 11:00am-12:00pm

Logistics

- Lectures: Tuesdays 3:00pm – 5:00pm in E53-438

- Recitations: Fridays 12:00pm – 1:00pm in E53-438

- TA Office Hour: Mons 11:00am – 12:00pm in E53-438

Overview and Goals

This course provides an introduction to formal theoretical analysis in political science. This course is designed as a rigorous introduction to the concepts and models used to analyze political behavior in strategic contexts. The course focuses on non-cooperative game theory covering normal and extensive form games, games of incomplete information, repeated games, and bargaining.

Note: the topics covered in this class represent only a very small subset of political science research. If you enjoy this class, please consider a HASS concentration in Political Science. We also offer a major and a minor in Political Science, as well as a minor in Public Policy and a minor in Applied International Studies. Internships and research opportunities too. Check out these programs and more at: `http://web.mit.edu/polisci/undergraduate/index.html`.

Prerequisites

Willingness to work hard on unfamiliar materials. Understanding of the multivariate calculus equivalent to the contents covered in the department's second math camp course. (If you did not

complete the math camp, contact the instructor to see if you have enough background.) The course will occasionally rely on some methods of mathematical proof (e.g., proof by contradiction, proof by induction, etc), but prior exposure to them is not assumed.

Course Requirements

The final grades are based on the following items:

- **Problem sets** (36%): Eight weekly problem sets will be given throughout the semester. Problem sets will contain analytical questions and mathematical proofs. Each problem set will be graded on the scale of $(+, \checkmark, -)$ and contribute equally toward the calculation of the final grade. The following instructions will apply to all problem sets unless otherwise noted.

  - Late submission will not be accepted unless you ask for special permission from the instructor in advance. (Permission may be granted or not granted, with or without penalty, depending on the specific circumstances.)
  - Working in groups is encouraged, but each student must submit their own writeup of the solutions. We also ask you to write down the names of the other students with whom you solved the problems together on the first sheet of your solutions.
  - For analytical questions, you should include your intermediate steps, as well as comments on those steps when appropriate. All results should be presented so that they can be easily understood.
  - Students are strongly encouraged to use LaTeX, a typesetting system that has become popular in the field. Please make sure that your answers are legible.

- **Midterm** (30%): The in-class, closed-book midterm will take place on **Nov 7** during the regular class time. Please plan accordingly.

- **Final problem set** (30%): The final assignment of the term will be a special problem set, which will be weighted more heavily toward the calculation of the final grade. You will not be allowed to collaborate with anybody on the final problem set. This is to check if you have developed sufficient experience to work through problems on your own. The assignment will be due the last day of class on **Dec 12**.

- **Participation** (4%)

Notes on Academic Integrity

Please respect and follow the rules written in MIT's handbook on academic integrity, which is available at:

$$\text{http://web.mit.edu/academicintegrity/}$$

In particular, the following is a (partial) list of the acts we will consider academically dishonest:

- Obtaining or consulting course materials from previous years

- Sharing course materials with people outside of the class, such as problem sets and solutions

- Copying and pasting someone else's answers to problem sets electronically, even if you collaborated with the person in a legitimate way (as specified above)

Recitation Sessions

Weekly recitation sessions will be held on Fridays, while the timeslot and venue is TBD. Please fill in the Doodle poll (https://goo.gl/6o38UL) by the end of today (**September 12**), so that we can secure the room. The session will cover a review of the theoretical material and also provide help with problem sets. The teaching assistant will run the sessions and can give more details. Attendance is strongly encouraged.

Course Website

The course website is located at the following URL:

<div align="center">http://stellar.mit.edu/S/course/17/fa17/17.811/</div>

This site will provide lecture slides, homework assignments, and the links to reading materials.

Questions about Course Materials

In this course, we will utilize an online discussion board called *Piazza*. Below is an official blurb from the Piazza team:

> Piazza is a question-and-answer platform specifically designed to get you answers fast. They support LaTeX, code formatting, embedding of images, and attaching of files. The quicker you begin asking questions on Piazza (rather than via individual emails to a classmate or one of us), the quicker you'll benefit from the collective knowledge of your classmates and instructors. We encourage you to ask questions when you're struggling to understand a concept ... See this New York Times article to learn more about their founder's story:
> http://www.nytimes.com/2011/07/04/technology/04piazza.html

In addition to recitation sessions and office hours, please use the Piazza Q & A board when asking questions about lectures, problem sets, and other course materials. You can access the Piazza course page either directly from the below address or the link posted on the Stellar course website:

<div align="center">https://piazza.com/mit/fall2017/17810</div>

Using Piazza will allow students to see other students' questions and learn from them. Both the TA and the instructor will regularly check the board and answer questions posted, although everyone else is also encouraged to contribute to the discussion. A student's respectful and constructive participation on the forum will count toward his/her class participation grade. **Do not email your questions directly to the instructors or TAs** (unless they are of personal nature) — we will not answer them!

Books

Required Book

There will be required readings for each section of the course. Students are expected to complete them before the relevant materials are covered in the lectures. The following textbook is required and will be used throughout the course. All these books have been put on reserve at MIT Libraries.

- Robert Gibbons. *Game Theory for Applied Economists.* Princeton University Press.

Optional Books

The following books are optional but may prove useful to students looking for additional coverage of some of the course topics. Most of these books have also been put on reserve at MIT Libraries. Also, you may be able to get them via interlibrary loan services such as Borrow Direct.

Other good textbooks:

- Martin J. Osborne. *An Introduction to Game Theory.* Oxford University Press

- Drew Fudenberg and Jean Tirole (FT) *Game Theory.* The MIT Press.

- Mas-Colell, Whinston, and Green (MWG) *Microeconomic Theory.* Oxford University Press

    - FT and MWG are recommended if you want more rigorous treatments of the materials covered in the course

For political science applications:

- Torsten Persson and Guido Tabellini. *Political Economics: Explaining Economic Policy.* The MIT Press.

- McCarty and Meirowitz. *Political Game Theory*

For math background:

- Gill, Jeff. *Essential Mathematics for Political and Social Research.* 1st Edition. 2nd printing. New York: Cambridge University Press.

- Simon, Carl and Blume, Lawrence. *Mathematics for Economists.* New York: Norton.

Course Schedule and Reading Assignments

1 Preferences and Utility Representations

- Rational Choice

- Preference ordering

- Utility representations

- Social Choice Theory

Optional Readings:

- MWG: Ch.1

- McCarty and Meirowitz: Ch.2 & Ch.4

2 Games in Strategic Form and Nash Equilibrium

- Gibbons. 1.1C, 1.3

3 Extensive Form Games

- Gibbons. 2.1, 2.2, 2.4

Optional Readings:

- Grossman, Gene and Elhanan Helpman (1994). "Protection for Sale." *The American Economic Review.* 84 (4), 833–850.

- Baron and Ferejohn (1989). "Bargaining in Legislatures." *American Political Science Review,* vol. 83, pp. 1181–1206

4 Repeated Games

- Gibbons. 4.1–4.3, 5.1, 4.4

5 Static Games of Incomplete Information

- Gibbons. Ch.3

6 Dynamic Games of Incomplete Information

- Gibbons. 4.1, 4.2, 4.3A

Optional Readings:

- Potters, Jan and Frans van Winden (1992). "Lobbying and Asymmetric Information." *Public Choice* 74 (3), pp.269–292

7 Applications in Political Science

If time permits, some additional selected topics may also be covered.

- Probabilistic Voting Model: Lindbeck, Assar, and Jörgen W. Weibull (1987). "Balanced-budget Redistribution as the Outcome of Political Competition." *Public choice* 52(3), 273–297

- Citizen Candidate Model (strategic voting): Besley and Coate (1997). "An Economic Model of Representative Democracy." *The Quarterly Journal of Economics.* 112 (1), 85–114. (1997)

- Electoral Competition: Persson and Tabellini. Ch 2.

- Partisan Politicians: Persson and Tabellini. Ch 5.

- Special-interests Politics: Persson and Tabellini. Ch 7.