

SOSC 13310 1

Social Science Inquiry: Formal Theory 3

Spring, 2022

Instructors: Professor Zhaotian Luo, luozhaotian@uchicago.edu
Class time: Tuesday and Thursday 9:30-10:50 a.m.
Class location: Pick 222
Office hours: Pick 528, Thursday 12:20-3:00 p.m. (no appointment needed)

DISCLAIMER

This syllabus is subject to minor ongoing revision. I will adjust as necessary, depending on how long specific topics take.

DESCRIPTION

This course is the third part of the three-quarter sequence of Social Science Inquiry: Formal Theory. Enrollment in the sequence is required. The course has two main components. The first half is about games with incomplete information, which helps students understand the two equilibrium concepts developed to solve these games: Bayesian Nash equilibrium for static games with incomplete information and perfect Bayesian equilibrium for dynamic ones. The second half briefly introduces two theories about how games can be tailored to serve the interests of some designer, developed on the basis of game theory: mechanism design and information design. Students are expected to participate in all sessions, learn the techniques introduced, and have an idea about how to use these techniques to solve problems of their interests.

REQUIREMENTS

There will be 3 problem sets. Students are required to attend all lectures, during which techniques necessary for the problem sets will be developed and introduced in detail.

In addition, each student is required to write a research proposal due in the end of the quarter. The proposal should set up a game-theoretic model about a real political scenario, explain why the model is parsimonious for that scenario, and discuss about the appropriate equilibrium concept to solve the model. Complete solution of the model is encouraged but

not required. The proposal should be strictly less than 10 pages (double spaced, font size 12). In the last week of the course, students present their proposals.

ASSESSMENT

1. Problem sets (60%, 20% for each).
2. Research proposal (30%).
3. Presentation (5%).
4. Class participation (5%).

TEXTS

There are no assigned texts for this course. The slides serve as self-contained lecture notes. The following textbooks can be used as reference:

- Osborne, Martin. 2004. *An Introduction to Game Theory*.
- Laffont, Jean-Jacques and David Martimort. 2002. *The Theory of Incentives: the Principal-Agent Models*.

Osborne (2004) contains a lot of examples and is good for developing an initial understanding of game theory. Laffont and Martimort (2002) is a comprehensive introduction to the techniques of mechanism design.

For students who are interested in knowing the mathematical rigor of game theory, consider

- Fudenberg, Drew and Jean Tirole. 1991. *Game Theory*.

and the game theory part of

- Mas-Colell, Andreu, Michael Whinston, and Jerry Green. 1995. *Microeconomic Theory*.

OUTLINE

Introduction: belief, information, and common knowledge

Games of incomplete information: simultaneous move

- Theory
- Application: coordination
- Application: global game

Reference:

- Osborne 9.1 – 9.5.

Games of incomplete information: sequential move

- Theory
- Application: leadership
- Application: signaling

Reference:

– Osborne 10.1 – 10.7.

Mechanism design: adverse selection

- Theory
- Application: principal-agent problem

Reference:

– Laffont and Martimort 2.1 – 2.6.

Mechanism design: moral hazard

- Theory
- Application: controlling politicians

Reference:

– Laffont and Martimort 4.1 – 4.4.

The art of manipulating information

- Communication through “cheap talk”
- Persuasion using data
- Persuasion using model
- Application: election rigging

Reference

- Crawford, Vincent, and Joel Sobel. “Strategic information transmission.” *Econometrica* 105, no. 6 (1982): 1431-1451.
- Kamenica, Emir and Matthew Gentzkow. “Bayesian persuasion.” *American Economic Review* 101, no. 6 (2011): 2590 – 2615.
- Schwartzstein, Joshua, and Adi Sunderam. “Using models to persuade.” *American Economics Review* 111, no.1 (2021): 276 – 323.

- Luo, Zhaotian and Arturas Rozenas. 2018. “Strategies of election rigging: trade-offs, determinants, and consequences.” *Quarterly Journal of Political Science* 13, no. 1 (2018): 1 – 28.

Presentations of research proposals