

PPHA 41501 – GAME THEORY

University of Chicago, Harris School of Public Policy

Autumn 2021, Monday/Wednesday 8:30-9:50am US-Central Time

Instructor: Roger Myerson, *Teaching Assistants:* Kisoo Kim and Jose Pascual Moreno

More information: <<https://home.uchicago.edu/~rmyerson/teaching/>>

Course description:

This class is a PhD-level introduction to game theory, which provides fundamental tools for analyzing strategic incentives in economics and political science. The course introduces basic concepts of game theory with an emphasis on applications in political economy. Topics include elements of decision theory, strategic-form games and Nash equilibria, extensive-form games and sequential equilibria, long-term relationships in repeated games, Bayesian games and games with communication, fundamentals of social choice theory.

Course requirements:

The course grade will be based on homework problem sets, a midterm exam, and a final exam. Homework is graded on basis of effort only. You may discuss problems with each other, but you must turn in your own work. Do not copy and paste answers from others' work.

Assignments will be at: <<http://home.uchicago.edu/~rmyerson/teaching/ppha41501hwk.pdf>>

Course readings:

The basic concepts of game theory are covered in many good textbooks. The treatment in this course will mainly follow the instructor's book:

[GT]: R. Myerson, *Game Theory* (Harvard, 1991).

But students may use other good books, such as: M. Osborne, *An Introduction to Game Theory* (Oxford, 2004); M. Osborne, A. Rubinstein, *A Course in Game Theory* (MIT, 1994); or G. Jehle, P. Reny, *Advanced Microeconomic Theory* (Addison-Wesley, 2011).

Additional **notes** on the topics in this course are posted online at

<<https://home.uchicago.edu/~rmyerson/teaching/ppha41501nts.pdf>>

The last part of the course will follow a survey paper by the instructor:

"Fundamentals of social choice theory," *Quarterly J. of Political Science* 8(3):305-337 (2013).

<<http://dx.doi.org/10.1561/100.00013006>>

The course may also use material in other survey articles and reviews by the instructor:

"Nash equilibrium and the history of economic theory," *Journal of Economic Literature* 36:1067-1082 (1999). <<https://www.jstor.org/stable/2564872>>

"Learning from Schelling's Strategy of Conflict," *Journal of Economic Literature* 47(4):1109-1125 (2009). <<https://www.jstor.org/stable/40651534>>

"Theoretical comparison of electoral systems," *European Economic Review* 43:671-697 (1999). <[https://doi.org/10.1016/S0014-2921\(98\)00089-0](https://doi.org/10.1016/S0014-2921(98)00089-0)>

Plan of topics: (roughly 3 class meetings per topic)

1. Elements of decision theory (GT sections 1.1-1.5, 1.8-1.9; notes pages 1-5)
2. Strategic-form games and Nash equilibrium (GT 3.1-3.5; notes 6-8)
3. Extensive games and sequential equilibrium (GT 2.1-2.2, 4.1-4.7; notes 9-11)
4. Repeated games (GT 7.1, 7.4-7.5; notes 12-16)
5. Bayesian games and games with communication (GT 2.8-2.9, 3.9-3.11, 6.1-6.7; notes 17-26)
6. Fundamentals of social choice theory (*QJPS* 8(3):305-337).