

ECON 1200: GAME THEORY

Syllabus Summer 2023

Instructor: Mengxi Sun

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Class Time: Mondays & Wednesdays 6 pm - 9:15 pm

Class Location: Posvar 4900

Office Hours: Monday 4 pm -5 pm, Tuesday 10 am - 12 pm, Wednesday 4 pm - 5 pm in Posvar 4519 and by appointment if you can't make it to any of the office hours.

Important dates:

First day of the class is on Monday, May 15th 2023

Midterm 1 takes place during the first 75 mins of the class on May 31st 2023

Midterm 2 takes place during the first 75 mins of the class on June 14th 2023

Final is comprehensive on the last day of the class on Wednesday, June 21st 2023

About

This course is an introduction to game theory—the science of strategic interaction. It offers a systematic way of analyzing strategic reasoning and behavior when decision-makers are affected by not only their own actions but also the actions of others. In addition to being

an essential tool of economic analysis, game theory also yields useful insights into business strategy, political science, computer science, sociology, biology, and other fields.

The main approach of this course is in “theory”. We will learn how to formally represent strategic situations and analyze them rigorously. As said by statistician George E.P. Box “all models are wrong, but some are useful”, the simple examples presented in class are intended to isolate and illuminate aspects of strategic interaction that arise in real situations. It is essential for you to recognize the crucial strategic tensions that shine through the abstraction.

Prerequisites

This course is primarily designed for undergraduate students who have had exposure to basic Calculus methods and Probability theory, and familiarity with Intermediate Microeconomics would be helpful but not required.

References

I will post all materials on Canvas, including class notes, study guides, and solutions to problem sets and exams. I do not follow closely to any specific textbook, but you are more than welcome to reference the following collection of books whenever you find them helpful. These are classics in introductory game theory:

- Osborne, An Introduction to Game Theory, Oxford University Press, 2003.
- Tadelis, Game Theory: An Introduction, Princeton University Press, 2013.
- Fudenberg and Tirole, Game Theory, MIT Press, 1991.

Topics

We will cover the following topics:

- 0 Introduction to Game Theory
- 1 Nash Equilibrium and Strategic Dominance (normal form representation)
- 2 Mixed Strategies
- 3 Sequential Games (extensive form representation)

4 Repeated Games

5 Bayesian Games and Information

6 Auctions

Grades

- Participation (5%) and problem sets (20%):
 - Participation: You will work on worksheets in groups during class time.
 - There are 5 problem sets, each worth 4%. Not all problems will be rigorously graded. I collect the problem sets mainly to get a sense of how you understand the material. The problem sets are opportunities for you to apply the concepts we talk about during lectures. And you are responsible to study the problem sets and the answer keys. Of course, if you need help, come to my office hours and ask! You are also encouraged to discuss and work with your fellow classmates.
- Exams (75%): two midterms and one final, worth 25% each.

All exams are closed-book, closed-note, and individual effort. You are allowed to bring a letter-sized “cheat sheet” (one-sided for midterms and two-sided for final) and a non-graphical calculator. Most of the exam questions will be a straightforward review of the material, closely parallel to problem sets. A few questions unlike those you have seen in the homework are there to test your critical comprehension of the material.

1. Midterm 1 tentatively covers topic 1-2
2. Midterm 2 tentatively covers topics 3-4
3. Final covers topics 1-6

Communication

If you anticipate or experience any difficulty fulfilling the requirements of the course, please inform me as soon as possible so that we have time to figure out the best solution. Contacting me about such issues at the end of the 6-week summer semester when your grade is lower than what you would like to be will unlikely change anything.

- Disability Services: If you have a disability for which you may be requesting an accommodation, you are encouraged to contact me and also the Office of Disability Resources and Services, 140 William Pitt Union, 412-648-7890/412-624-3346(Fax), as early as possible. For more information visit www.studentaffairs.pitt.edu.
- Missing Midterm: There is no makeup exams. If you have to miss a midterm, the weight will be redistributed to the Final. For example, if you have to miss Midterm 2, then Midterm 1 is worth 25% and Final is worth 50% for you.
- Regrading: You need to lay out your steps and logic for me in order to get partial credit. If you need assistance with your grade after comparing your work with the solution, please let me know. Do not write directly on your work when requesting a regrade. Modifying the original work and then requesting a regrade is a severe academic integrity violation. I will re-grade your work as a whole. Note that you are not guaranteed a higher grade with re-grading.

Academic Integrity

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action.

- Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, from the February 1974 Senate Committee on Tenure and Academic Freedom reported to the Senate Council, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the exam will be imposed. View the complete policy at www.cfo.pitt.edu/policies/policy/02/02-03-02.html
- Sharing class materials, including problem sets and exams on the internet is a violation of academic integrity.

Acknowledgement

I am grateful to Jetlir Duraj and Jiang Jiang for which these materials are based on their versions of this course.