

# ECON 4124: Game Theory

Department of Economics, HKUST

## Instructor

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TBA

## Course Overview

This course is about *games* — a very useful model of social and economic interactions. We will learn the fundamental concepts of games, in particular the *equilibrium*, and the techniques of analyzing games. Then we will apply game theory to examine a number of important real-life economic problems.

## Mixed Mode Arrangements

Each lecture will be recorded and made available at Canvas shortly after the lecture. Nonetheless, students are strongly encouraged to come to the classroom for the best learning experience. If every enrolled student is in Hong Kong (as officially proved by the University), no live Zoom session will be offered for remote attendance. On the other hand, live Zoom sessions will be offered only to students who are not in Hong Kong.

This class is mostly just lecturing — no group project, presentation, nor extensive class discussion. I will try my best to interact with all students, including those attending via Zoom.

Exams: If all students are in Hong Kong, then exams will be in-class. If some students are not in Hong Kong, then exams will be via Zoom *for all students*.

## **Prerequisites**

There will be math — make sure you are comfortable with that. The math will not be too advanced, though. In particular, calculus will not appear much, if ever. On the other hand, basic understanding of probability (i.e. random variables, expected values, the Bayes' rule) is required.

Knowledge of economic principles (ECON 2103/2113) is required. Intermediate microeconomics (ECON 3113/3133) is not a must, but would be helpful.

## **Textbook**

Technically there is no textbook. My lecture notes will be sufficient as study material. On the other hand, I loosely follow the structure and notation of Martin J. Osborne: *An Introduction to Game Theory* (Oxford), which you may find useful as supplementary reading.

Additional material of the textbook, including solution to some exercises, can be found at its official website:

<http://www.economics.utoronto.ca/osborne/igt/>.

## **Grading**

Homework assignments (20%), a midterm exam (35%), and a final exam (45%).

## **Homework**

Homework assignments are problem sets. Feel free to discuss the problems with anyone, but: Write the homework by yourself! Flagrantly copying other people's work violates the honor code.

## **Exams**

Exam dates are to be determined and will be announced two weeks in advance.

Final exam is cumulative.

## **Tutorials**

There will be tutorials, though not in every week. Your TA will use tutorials to discuss homework and other problems.

## **Course Objectives**

After taking the course, you are expected to have a good understanding of the main ideas of game theory, and know how to analyze social and economic phenomena from a game-theoretic perspective.

## **Honor Code**

There will be no tolerance for plagiarism and cheating. Any related offense will lead to disciplinary action including termination of studies at the University. Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations.

## **Course Plan**

We will cover the following topics (Chapter numbers correspond to Osborne's book)

- Introduction (Ch.1)
- Nash Equilibrium (Chs.2 and 3)
- Mixed Strategy Equilibrium (Ch.4)
- Extensive Games (Chs.5 and 6)
- Repeated Games (Ch. 14)
- Imperfect Information I (Ch.9)
- Imperfect Information II (Ch.10)

Then we will discuss some additional topics. The following list is tentative.

- Communication
- Voting
- Auctions
- Information aggregation and mechanism design

## **Objectives**

Per Program Intended Learning Objective for ECOF: After completing the course, students will

1. Understand the logic, scientific basis, and critical thinking of economic analysis (PILO 1)
2. Have a sophisticated knowledge of economics, apply it to explain economic and social phenomena, and make sound economic decisions (PILO 4)
3. Develop ability to qualitatively analyze basic economic and social problems. Conduct basic economic analysis and research of the economy and society (PILO 4)
4. Collaborate effectively with your team members to answer questions in homework (PILO 5, 7)
5. Have informed ethical thinking based on rigorous economic and social analysis (PILO 8)
6. Be a lifelong user of economic analysis (PILO 9)