

# ECON 4124

## Game Theory

Department of Economics, HKUST

### **Instructor**

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### **Overview**

This course is about games—a very useful model of social and economic interactions. We will cover 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-world economic problems.

### **Prerequisites**

There will be math—make sure you are comfortable with that. The math will not be too advanced, though. While calculus will be just mildly involved, familiarity with fundamental concepts of probability—such as random variables, expected values, and Bayes' rule—is essential.

Additionally, a background in economic principles (ECON 2103/2113) is required. Knowledge of intermediate microeconomics (ECON 3113/3133) is not mandatory, but it would be beneficial.

### **Learning materials**

I will provide comprehensive lecture notes (slides) that are self-contained and sufficient for homework and exams. For further explanations, examples, and exercises, the following book is highly recommended:

*An Introduction to Game Theory* by Martin Osborne, Oxford University Press

Additional resources, including solutions to some exercises, are available on the book's official website at:

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

## **Grading**

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

Assignment of letter grades is based on the following rubrics:

- A: Excellent. Students demonstrate a strong grasp of course materials, effectively utilize tools discussed, excel in problem sets, and perform exceptionally on exams.
- B: Good. Students exhibit a solid understanding of course materials, proficient use of tools, and competent completion of problem sets.
- C: Satisfactory. Students demonstrate an adequate understanding of course materials, satisfactory use of tools, and completion of problem sets.
- D: Marginal pass. Students show limited understanding of course materials, inconsistent use of tools, and incomplete performance in problem sets.
- F: Fail. Students display a lack of understanding of course materials, inadequate use of tools, and unsuccessful completion of problem sets.

## **Homework**

Problem sets will be assigned approximately every two weeks, and grading will be based on effort. You are encouraged to discuss the problems with classmates or use generative AI tools for assistance. However, it is important that you write the solutions in your own words.

## **Exams**

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

Midterm is in-class.

Final is cumulative.

## **Tutorials**

We will conduct tutorials, although they will not be scheduled regularly. Please make sure to stay attentive to course emails for any tutorial announcements.

## **Main topics**

- Nash equilibrium
- Extensiv games
- Imperfect and incomplete information
- Applications

## **Intended learning outcomes**

Upon successfully completing this course, you will gain a solid understanding of conceptual and technical tools essential for undergraduate game theory. According to the learning goals and objectives (ILOs):

(Problem sets and exams) Students will become comfortable with mathematical models of economics and be able to construct and analyze them (ILO 1).

(Problem sets and exams) Students will be able to produce coherent and easy-to-follow solutions or proofs for analytical problems in economics (ILO 2).

## **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.