

ECON4124  
Applied Game Theory  
Time: 10:30-11:50AM Mon & Wed  
Location: 2302 Main Academic Building (via Lift 17-18)

Instructor: Wooyoung Lim  
Office: LSK 6008  
Office Hours: by appointment  
Email: wooyoung@ust.hk

## 1 Course Objective

This course introduces the basic concepts of game theory. The emphasis is on the unifying perspective that game theory offers to questions in economics, other disciplines, and everyday life. It will enable students to view social interactions as strategic games, to use game theoretic concepts to predict behavior in these interactions and to conceive of ways in which altering the game affects social outcomes.

## 2 Teaching Assistant

- Shiyi Liu (sliudp@connect.ust.hk)
- Office Hours: Friday 10:30AM-11:30AM & by appointment

## 3 Required Readings

1. Lecture Notes: course web at [Canvas.ust.hk](http://Canvas.ust.hk)

## 4 Recommended Readings Reserved in the Library

1. Martin J. Osborne (OB) “An introduction to Game Theory,” Oxford University Press.
2. Dixit, Avinash, Susan Skeath, and David H. Reiley Jr. (DSR) “Games of Strategy,” W. W. Norton & Company, Third Edition 2009.

## 5 Course Intended Learning Outcomes

Upon successful completion of the course, students will be able to:

1. Model strategic interactions using formal game-theoretic language.

2. Identify and compute equilibrium outcomes (e.g., Nash Equilibrium, Subgame Perfect Nash Equilibrium) in various types of games.
3. Analyze the impact of informational asymmetries on strategic behavior.
4. Apply game theory concepts to explain phenomena in economics and other social sciences.

## 6 Course Requirement and Evaluation

- Evaluation will be based upon class participation (20%), a mid-term (35%), and a final exam (45%). **Class participation** will be assessed based on active discussion, attendance, and your engagement during the in-class experiments.
- Bi-weekly problem sets (5-6 times) will be handed out. These are highly recommended formative exercises to prepare you for the exams. Brief solutions will be provided after one week. Questions in the mid-term and final will be similar to the questions in the problem sets.
  - Note that only simple answers for the assignments will be provided. Students are responsible to obtain the detailed solution by discussing with classmates, peers, teaching assistants, and me.
  - We strongly encourage you to use a GenAI when solving the problem sets. You could regard the GenAI as your TA helping you understand the course materials. We encourage using GenAI on problem sets as a learning tool to explore concepts and deepen your understanding. However, the exams are designed to assess your individual mastery of the material without external assistance, so any AI's help will be strictly prohibited in the midterm and final.
- **Both midterm and final will be AI-free, unaided, closed-book, in-class exams.**
- The midterm exam contains all the materials covered before the exam, and is scheduled on **October 12, Monday**, during the class time. The exam venue is **Room XXX in the Main Academic Building**. The final exam contains all the materials covered throughout the semester. In the case of absence at an exam due to medical reasons, the student is required to submit a medical certificate issued by a registered medical practitioner. The medical document can be submitted after the exam, but you should inform the instructor **before the exam starts** and arrange the make-up exam. Appropriate documentation will be required for absences due to other reasons. Announcements, lecture slides, and supplementary materials (if any) will be updated onto the course website at Canvas.ust.hk. If a student finds difficulties in the course and has any concern about the course, it is his/her benefit to contact me or the teaching assistant at an early stage.

## **7 Course Outline (tentative, subject to change.)**

### **September 2**

- Introduction

### **September 7 & 9**

- Lecture Note 1: Elements of a Game, Thinking Strategically, Sequential-move Games (OB Chapter 1, 5, 6 / DSR Chapters 1,2,3).
- [Classroom Experiment] Guessing Game, Centipede Game

### **September 14 & 16 (via Zoom)**

- Lecture Note 2: Simultaneous-move Games (OB Chapter 2, 3 / DSR Chapter 4)
- [Classroom Experiment] Pure-Coordination Game, Assurance Game
- Class Zoom link (Sep. 16): 996 158 8029

### **September 21 & 23**

- Lecture Note 3: Best-response Curve Analysis (OB Chapter 3 / DSR Chapter 5, 6)
- Lecture Note NE: Existence of Nash Equilibrium

### **September 28 & 30**

- Lecture Note 4A&B: Mixed-strategy (OB Chapter 4 / DSR Chapter 7, 8)

### **October 5 & 7**

- Lecture Note 5A&B: Games with Incomplete Information (OB Chapter 9 / DSR Chapter 9)
- [Classroom Experiment] Monty Hall Game.

### **October 12: Midterm, Room XXX in the Main Academic Building**

### **October 14 & 21**

- Lecture Note 6: Equilibrium Refinement (OB Chapter 10 / DSR Chapter 9)

### **October 26 & 28**

- Lecture Note 7: Equilibrium Refinement in Signaling Game

### **November 2 & 4**

- Lecture Note 8: Repeated Prisoners' Dilemma (OB Chapter 14 / DSR Chapter 11)

### **November 9 & 11**

- Lecture Note 9: Auction & Mechanism Design (OB Chapter 9 / DSR Chapter 14, 17)
- [Classroom Experiment] Ascending auction / Common-value auction

#### **November 16 & 18**

- Lecture Note 10: Bargaining Theory (OB Chapter 16 / DSR Chapter 18)
- [Classroom Experiment] Ultimatum Bargaining

#### **November 23 & 25 & 30**

- Lecture Note 11: Rationality and Bounded-rationality (OB Chapter 12)
- A Lecture on Behavioral Economics
- [Classroom Experiment] 11-20 Money Request Game.

**Final Exam: TBD**

## **8 Learning Environment**

Matured conduct in classroom is the requirement for this course. Distractive behaviors such as use of cell phone, instant messaging and chatting are not tolerated. Violation of this rule will result in significant deduction of points from student's grade. Please refer to following website for the guideline for good learning environment:

[http://www.ust.hk/vpao/conduct/good\\_learning\\_experience.pps](http://www.ust.hk/vpao/conduct/good_learning_experience.pps).

## **9 Academic Integrity Policy**

Honesty and Integrity is central value in HKUST. Please be aware of the importance and maintain high standard of honesty in the problem sets and examinations in this course. Familiarize yourself to the university rules and the HKUST academic honor code by visiting following website: <http://www.ust.hk/vpao/integrity/>.