

THE UNIVERSITY OF HONG KONG
FACULTY OF BUSINESS AND ECONOMICS School
of Economics and Finance

ECON6036 Game Theory and Applications
Second semester 2022-23

GENERAL INFORMATION

Instructor: Dr. Y. Stephen Chiu

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Consultation times: Wednesdays, 2-3:30pm and by appointment

Meeting time: 9:30am – 12:30pm Saturdays

Meeting Venue: KKL1121 K. K. Leung Building (except for Feb 11, 18, 25 and Mar 11, KK101)

Meeting dates: Feb 11, 18, 25, Mar 4, 11, 18, 25, April 1, 15, 22, 29, and May 6

Pre-requisites: Despite no formal pre-requisites, this course is intended and designed for research students doing their MPhil/PhD. That is, this is a rather technical course.

Course Website: available through HKU Portal e-learning

Other important details: An additional meeting will be added if there is not enough time for student presentation

This course is conducted in face to face. If for whatever reasons you have to attend online, make sure you show your face and show your complete real name. You may not be allowed to attend the class otherwise.

COURSE DESCRIPTION

This course will explore the multi-person decision-making situations when players' payoffs depend on other players' choices. Game theory has notable applications in many fields, such as economics, law, business, finance and political science. We will first review the theoretical frameworks and then focus on applications such as reputation, communication, collective decision-making, modelling knowledge, and global games. Students are expected to know basic probability theory and calculus, and to be comfortable thinking mathematically and doing proofs.

COURSE OBJECTIVES

1. Provide students with fundamental tools of game theory.
2. Provide students with solid skills to analyze game theoretic situations.
3. Develop students' appreciation in modelling real world multi-person decision situations.

FACULTY GOALS

Goal 1: Acquisition and internalization of knowledge of the programme discipline

Goal 2: Application and integration of knowledge Goal

Goal 3: Inculcating professionalism and leadership

Goal 4: Developing global outlook

Goal 5: Mastering communication skills

COURSE LEARNING OUTCOMES

Course Learning Outcomes	Aligned Faculty Goals
CLO1 Reconstruct fundamental game theory models and clearly state their assumptions and predictions and work out the analysis.	1,2
CLO2 Be able to convert a standard multi-person decision situation into an analytic model and correctly analyze it.	1,2,3
CLO3 Apply and explain appropriate models or modifications to some real world issues and work out its policy implications.	2,3,4,5

COURSE TEACHING AND LEARNING ACTIVITIES

Course Teaching and Learning Activities	Expected contact hour	Study Load (% of study)
T&L1. Lectures	33 hours	20.4%
T&L3. Problem Sets	32 hours	10%
T&L4. Self Study	96 hours	59.6%
...		
Total	161	100%

Assessment Methods

Assessment Methods	Brief Description (Optional)	Weight	Aligned Course Learning Outcomes
A1. Attendance and participation		5%	CLO1,2,3
A2. Problem Sets		25%	CLO1,2,3
A3. Mid-term Test		25%	CLO1,2,3
A4. Final Exam		45%	CLO1,2,3
	Total	100%	

STANDARDS FOR ASSESSMENT

Course Grade Descriptors

A+, A, A-	All or almost all of the questions are clearly and accurately responded. All or almost all of the responses are well organized, clear, fluent, and with sufficient elaboration.
B+, B, B-	Most of the questions are clearly and accurately responded. Most of the responses are well organized,

	clear, fluent, and with sufficient elaboration.
C+, C, C-	Some of the questions are clearly and accurately responded. Some of the responses are well organized, clear, fluent, and with sufficient elaboration.
D+, D	Few of the questions are clearly and accurately responded. Few of the responses are well organized, clear, fluent, and with sufficient elaboration.
F	Very few of the questions are clearly and accurately responded. Very few of the responses are well organized, clear, fluent, and with sufficient elaboration

Assessment Rubrics for Each Assessment

Attendance and participation: you are supposed to be present (in site) for at least 8 lectures. You will get 3 points if you do so; you will get 0 points otherwise. Active participation may help you earn the other 2 points.

For problem sets, the assessments are based on whether effort have shown to be put in, rather than whether the answers are correct. Timely completion is essential; no late submission is accepted.

Assessment Rubrics for the mid-term exam and the final exam are the same for the course grade descriptors.

Tentative mapping of grades and the overall performance:

A-, A, A+: >80
 B-, B, B+: 68-79.99
 C-, C, C+: 56-67.99
 D, D+: 44-55.99
 F: <44

COURSE CONTENT AND TENTATIVE TEACHING SCHEDULE

Week	Date	Topic	reading
1	Feb 11	Strategic Games with complete information: finding Nash equilibrium (NE), Mixed strategy NE; existence and properties of NE,	OR 2.1 – 2.3, 3.1-3.2 FT Ch 1
2	Mar 18	dominance and rationalizability; purification	OR Ch 4 FT Ch 2
3	Mar 25	Extensive form games with perfect information: definitions, backward induction, subgame perfect NE, alternating bargaining games.	OR Ch 6, FT Ch 3, 4.4
4	Mar 04	Same as above	
5	Mar 11	Repeated games: perfect monitoring and imperfect monitoring	OR 8.2&8.3, 8.5, 8.9, and 8.10 FT Ch 5
6	Mar 18	Strategic form games with incomplete Bayesian Nash equilibrium	OR 11.1 to 11.5 FT 6information CH 7
7	Mar 25	Mid term exam	OR Ch 12 FT CH 7
8	Apr 1	Extensive Games with incomplete information: perfect Bayesian NE, refinements	FT Ch 9,
9	Apr 15	mechanism design and implementation, Auction theory	Krishna, chapters 1 to 5
10	Apr 22	Reputation models	Kreps and Wilson (1982)
11	Apr 29	Strategic communication	Crawford & Sobel (1982)
12	May 6	Other topics	"Global Games: Theory and Applications," in Advances in Economics and Econometrics (Proceedings of the Eighth World Congress of the Econometric Society), edited by M. Dewatripont, L. Hansen and S. Turnovsky. Cambridge, England: Cambridge University Press (2003)

REQUIRED/RECOMMENDED READINGS & ONLINE MATERIALS (e.g. journals, textbooks, website addresses etc.)

The following are useful to various extent, but none of them will be followed closely

Osborne, M.J. and A. Rubinstein, *A Course in Game theory*, MIT Press 1994. (OR) (primary) (An online copy is available at <http://arielrubinstein.tau.ac.il/books.html>)

Fudenberg and Tirole, *Game Theory*, MIT Press, 1991. (FT) (primary)

Krishna, Vijay, *Auction Theory*, Academic Press, 2002.

Watson, J., *Strategy: An Introduction to Game Theory*, Norton. (supplementary; it's a good undergraduate text)

Gibbons, *Game Theory for Applied Economists*, Princeton University Press 1992. (supplementary; excellent senior undergraduate/master level text, examples are too old though)

趙耀華，蒲勇健 《博弈論與經濟模型》人民大學出版社 2010 (reference only)

MEANS/PROCESSES FOR STUDENT FEEDBACK ON COURSE

- conducting mid-term survey in additional to SETL around the end of the semester
- Online response via Moodle site

COURSE POLICY (e.g. plagiarism, academic honesty, attendance, etc.)

Academic dishonesty

The University Regulations on academic dishonesty will be strictly enforced! Please check the University Statement on plagiarism on the web: <http://www.hku.hk/plagiarism/>

Academic dishonesty is behavior in which a deliberately fraudulent misrepresentation is employed in an attempt to gain undeserved intellectual credit, either for oneself or for another. It includes, but is not necessarily limited to, the following types of cases:

- a. Plagiarism - The representation of someone else's ideas as if they are one's own. Where the arguments, data, designs, etc., of someone else are being used in a paper, report, oral presentation, or similar academic project, this fact must be made explicitly clear by citing the appropriate references. The references must fully indicate the extent to which any parts of the project are not one's own work. Paraphrasing of someone else's ideas is still using someone else's ideas, and must be acknowledged.
- b. Unauthorized Collaboration on Out-of-Class Projects - The representation of work as solely one's own when in fact it is the result of a joint effort.
- c. Cheating on In-Class Exams - The covert gathering of information from other students, the use of unauthorized notes, unauthorized aids, etc.
Unauthorized Advance Access to an Exam - The representation of materials prepared at leisure, as a result of unauthorized advance access (however obtained), as if it were prepared under the rigors of the exam setting. This misrepresentation is dishonest in itself even if there are not compounding factors, such as unauthorized uses of books or notes.

Where a candidate for a degree or other award uses the work of another person or persons without due acknowledgement:

- 1. The relevant Board of Examiners may impose a penalty in relation to the seriousness of the offence;
- 2. The relevant Board of Examiners may report the candidate to the Senate, where there is prima facie evidence of an intention to deceive and where sanctions beyond those in (1) might be invoked.

ADDITIONAL COURSE INFORMATION (e.g. e-learning platforms & materials, penalty for late assignments, etc.)

Exams

There will be one mid-term exam and one final exam. The mid-term exam is tentatively scheduled for Mar 25 (Sat) during lecture time. The final exam will be arranged by the examination section of the university. All exams will be closed-note and closed-book. You may bring a hand-held calculator along with you while taking an exam. There is no made up exam for the mid-term exam. Those absent in the mid-term exam with approved reasons will have the share of the exam moved to the final exam. Any violations of academic integrity in a test or exam will result in a failing grade or a more severe punishment.

Problem sets

You will be given 4 to 5 problem sets. You are strongly recommended to work on them. You must write up your own scripts while you are encouraged to discuss with your fellow classmates.

All additional course materials can be found in Moodle through HKU portal