

**City University of Hong Kong
Course Syllabus**

**offered by Department of Economics and Finance
with effect from Semester A 2017/18**

Part I Course Overview

Course Title: Applications of Game Theory to Business

Course Code: CB2041

Course Duration: 1 Semester

Credit Units: 3

Level: B2

Arts and Humanities

Proposed Area:
(for GE courses only)

Study of Societies, Social and Business Organisations

Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) Nil

Precursors:
(Course Code and Title) Nil

Equivalent Courses:
(Course Code and Title) Nil

Exclusive Courses:
(Course Code and Title) GE2256 Applications of Game Theory to Business

Part II Course Details

1. Abstract

This course focuses on strategic decision-making in interactive situations where different individuals must anticipate what others are going to do. Game theory offers a systematic way to study environments with strategic interactions. The ultimate goal of this course is to enhance the student’s ability to think strategically in complex, interactive situations. This course also encourages discovery learning, which takes place when students apply their knowledge and skills in game theory to discover solutions to problems in business and life.

An introduction of the main ideas and techniques of game-theoretic analysis related to cooperation, coordination, pricing, location choice, bargaining, conflict, negotiation, bidding in auctions, cheap talk and other strategic interactions in business will be presented. We will adopt a problem-centred approach and use equilibrium analysis in a variety of settings.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs [#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Recognize, identify and assess standard strategic situations in business and other social settings.		√	√	√
2.	Formalize real-life economic and business situations using game-theoretic models and be able to make decisions under uncertainty.		√	√	
3.	Apply game-theoretical analysis, both formally and intuitively, to strategic business scenarios.		√	√	√

* If weighting is assigned to CILOs, they should add up to 100%.

100%

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	The lectures introduce fundamental concepts in game theory to students and encourage them to think critically and logically, with the aim to train students to identify strategic interactions prevalent in business activities and develop their ability to solve new business problems by themselves.	√	√	√	3 hours
In-class exercises	Throughout the semester, in-class exercises in the form of 'learning by doing' problems and simple experiments will be conducted. This will form a part of the lectures.	√	√	√	
Discussion of Experimental Results or Case Studies	Experimental results or case studies will be discussed in the lectures. Students will be encouraged to apply the various theories of game theory to analyse specific industry problems and business practices.		√	√	
Problem sets	Problems sets will be assigned regularly. Students will be asked to find solutions to problems utilizing the methods taught in the lectures.		√	√	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting*	Remarks
	1	2	3		
Continuous Assessment: 50%					
Midterm Exam	√	√	√	20%	
Problem Sets		√	√	10%	
Group project	√	√	√	20%	Students need to write a short paper on a real-life application of game theory
Examination: 50% (duration: 2 hours, if applicable)					
Final examination	√	√	√	50%	
* The weightings should add up to 100%.				100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Mid-term Exam	1.1 Ability to apply various concepts learnt in class to different applied problems 1.2 Ability to solve problems of strategic interaction	High	Significant	Moderate	Basic	Not even reaching marginal levels
Problem Sets	2.1 Ability to apply various concepts learnt in class to different applied problems 2.2 Ability to solve problems of strategic interaction	High	Significant	Moderate	Basic	Not even reaching marginal levels
Group project	3.1 Ability to identify a strategic interaction in a business activity 3.2 Apply knowledge of game theory learnt in lectures to a problem in business interaction 3.3 Novelty of the idea 3.4 Ability to communicate clearly, concisely and effectively through write-up of the project	High	Significant	Moderate	Basic	Not even reaching marginal levels
Final Examination	4.1 Ability to apply various concepts learnt in class to different applied problems 4.2 Ability to solve problems of strategic interaction	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

- Overview of Game Theory (Rationality, Common Knowledge; Look forward, Reason back)
- Static Games and Nash Equilibrium: Simultaneous moves, discrete strategies, continuous strategies, applications to industrial organization (price setting; quantity setting; location choice)
- Dominant Strategies; Rationalizability; Mixed strategies
- Public Choice and Free Rider Problem
- Extensive-form games, subgame-perfect Nash equilibrium, solving via backward induction
- Tacit coordination, threats and promises for cooperation; Limits to cooperation
- Bargaining; Trust; Reciprocity
- Static Games with Incomplete Information; Bayes-Nash equilibrium; Auctions
- Information Transmission and Cheap Talk

There will be in-class exercises that will be conducted throughout the semester. Some of them will be in the form of simple experiments.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Dixit, A., S. Skeath and D. Reiley, 2009. <i>Games of Strategy</i> . 4 th edition. W.W. Norton.
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2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Watson, J, 2013: <i>Strategy: An Introduction to Game Theory</i> , 3rd edition. W. W. Norton)
2.	Dixit, A. K., & Nalebuff, B. J. (1993). <i>Thinking strategically: The competitive edge in business, politics, and everyday life</i> . WW Norton & Company.
3.	Vohra, R. V., & Krishnamurthi, L. (2012). <i>Principles of Pricing: an analytical approach</i> . Cambridge University Press.