

GE2256: APPLICATIONS OF GAME THEORY TO BUSINESS

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Applications of Game Theory to Business

Subject Code

GE - Gateway Education

Course Number

2256

Academic Unit

Economics and Finance (EF)

College/School

College of Business (CB)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

GE Area (Primary)

Area 2 - Study of Societies, Social and Business Organisations

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

CB2041 Applications of Game Theory to Business

Part II Course Details

Abstract

This course focuses on strategic decision-making in interactive situations where different individuals must anticipate what others will 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 to 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 situations in business will be presented. We will adopt a problem-centered approach and use equilibrium analysis in various settings.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Apply standard strategic situations in business and other social settings.		x	x	x
2	Design real-life economic and business situations using game-theoretic models and be able to make decisions under uncertainty.		x	x	
3	Apply game-theoretical analysis, both formally and intuitively, to strategic business scenarios.		x	x	x

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 real-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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will engage in 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.	1, 2, 3	3 hours

2	In-class exercises	Students will carry out 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.	1, 2, 3	
3	Discussion of Experimental Results	Student will discuss experimental results in the lectures. Students will be encouraged to apply the various theories of game theory to analyse specific industry problems and business practices.	2, 3	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Midterm Exam	1, 2, 3	10	
2	Homework Assignment	1, 2, 3	10	
3	Group project	1, 2, 3	30	Students have to write a term paper on an application of game theory to economics, business, or a geo-political issue of their choice.
4	Class participation	1, 2, 3	10	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

Students are required to pass both coursework and examination components in order to pass the course.

Assessment Rubrics (AR)**Assessment Task**

Homework Assignment

Criterion

- 1.1 Ability to apply concepts learnt in class to different applied problems
- 1.2 Ability to solve problems of strategic interaction

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Midterm Exam

Criterion

2.1 Ability to apply various concepts learnt in class to different applied problems

2.2 Ability to solve problems of strategic interaction

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Group project

Criterion

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

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Class participation

Criterion

4.1 Participate in the in-class experiments/exercises to be conducted throughout the course

Excellent (A+, A, A-)

Participation in all in-class exercises

Good (B+, B, B-)

Participation in 75% of the in-class exercises

Fair (C+, C, C-)

Participation in 50% of the in-class exercises

Marginal (D)

Participation in only 25% of the in-class exercises

Failure (F)

No participation in any of the in-class exercises

Assessment Task

Final Examination

Criterion

5.1 Ability to apply various concepts learnt in class to different applied problems

5.2 Ability to solve problems of strategic interaction

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

1. Overview of Game Theory (Rationality, Common Knowledge; Look forward, Reason back)
 2. Static Games and Nash Equilibrium: Simultaneous moves, discrete strategies, continuous strategies, applications to industrial organization (price setting; quantity setting; location choice)
 3. Dominant Strategies; Rationalizability; Mixed strategies
 4. Public Choice and Free Rider Problem
 5. Extensive-form games, subgame-perfect Nash equilibrium, solving via backward induction
 6. Tacit coordination, threats and promises for cooperation; Limits to cooperation
 7. Bargaining; Trust; Reciprocity
 8. Static Games with Incomplete Information; Bayes-Nash equilibrium; Auctions
 9. 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.

Reading List

Compulsory Readings

Title	
1	Dixit, A.K., S. Skeath and D. McAdams, 2020: Games of Strategy, 5th edition. W.W. Norton.

Additional Readings

Title	
1	Watson, J, 2013: Strategy: An Introduction to Game Theory, 3rd edition. W. W. Norton)

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

1, 2, 3

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

1, 2

PILO 3: Demonstrate critical thinking skills

1, 2, 3

PILO 4: Interpret information and numerical data

2, 3

PILO 5: Produce structured, well-organised and fluent text

2, 3

PILO 6: Demonstrate effective oral communication skills

1, 2, 3

PILO 7: Demonstrate an ability to work effectively in a team

2

PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues

1, 2, 3

PILO 9: Value ethical and socially responsible actions

1, 2, 3

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

1, 2, 3

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

Design an experiment to investigate on any aspect that is related to social preference, broadly defined. You need to be as specific as possible on what is your research question, hypothesis, contribution to the literature, and your experiment design. Page limit is 2 pages, excluding references.