

## COURSE CONTENT

<b>Course Coordinator</b>	Yuan Zhaoneng
<b>Course Code</b>	HE3602 / HE3032
<b>Course Title</b>	Game Theory
<b>Pre-requisites</b>	HE2001 Intermediate Microeconomics
<b>No of AUs</b>	3
<b>Contact Hours</b>	39 hours (2 hours lecture and 1 hour tutorial per week)

### Course Aims

Game theory is the study of strategic interactive decision-making. It is widely used in political science, psychology and evolutionary biology, and it is the dominant paradigm of modern economic analysis. The first part of this course introduces the central concepts and the tools of game theoretical analysis, and the second part focuses on the use of game theory in economics with applications drawn upon settings such as auctions, oligopoly and price wars, organizational design and labour contracts. The course is aimed at 3rd and 4th year students interested in using mathematical modeling to study economic questions.

### Intended Learning Outcomes (ILO)

By the end of this course, you (as a student) would be able to:

1. Describe what is a “game” in the language of game theory and define the key ingredients of a game.
2. Transform an economic relationship between two or more parties into a “game” and analyze (i.e., make predictions) the relationship from the lens of game theory.
3. Explain the differences in the information structure of a game and categorize each game into a game of perfect information, imperfect information, complete information, or incomplete information.
4. Apply the appropriate equilibrium concept for games with different information structures.
5. Critically evaluate the predictions made by each equilibrium concept and identify its short-comings.

## Course Content

1. Definition of a “game” and strategies.
2. Dominance and Rationalizability
3. Static games of complete information: Nash equilibrium (NE).
4. Application of NE: Cournot and Bertrand Competition
5. Dynamic games of complete information: subgame perfect Nash equilibrium (SPE).
6. Application of SPE: Stackelberg Model and Bargaining
7. Repeated Games
8. Static games of incomplete information: Bayes Nash equilibrium (BNE).
9. Application of BNE: auctions.
10. Dynamic games of incomplete information: perfect Bayesian Equilibrium (PBE)
11. Application of PBE: signaling and cheap talk.

## Course Assessment

CA1: Midterm Quiz	:	25%
CA2: Take-home Assignment	:	15%
CA3: Final Examination	:	50%
CA4: Participation	:	10%
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		<b>Total 100%</b>

## Reading and References

Gibbons, Robert. *A Primer in Game Theory*. MIT press, 1992.

## Course Instructors

Instructor	Office Location	Email
Yuan Zhaoneng	SHHK 04-52	zhaoneng.yuan@ntu.edu.sg

## Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
1	Definition of games	1-5	Lecture notes
2	Dominance and Rationalizability	1-5	Lecture notes and we
3	Pure and Mixed strategy Nash equilibrium	1-5	Lecture notes and homework exercises
4	Applications of NE	1-5	Lecture notes and homework exercises
5	Subgame perfect Nash equilibrium	1-5	Lecture notes and homework exercises
6	Application of SPE	1-5	Lecture notes and homework exercises
7	Midterm Quiz	1-5	-
Recess Week			
8	Repeated Games	1-5	Lecture notes and homework exercises
9	Bayesian Nash Equilibrium	1-5	Lecture notes and homework exercises
10	Application of BNE	1-5	Lecture notes and homework exercises
11	Subgame Perfect Bayesian equilibrium	1-5	Lecture notes and homework exercises
12	Application of PBE	1-5	Lecture notes and homework exercises
13	Revision	1-5	Lecture notes and homework exercises