



Academic Inquiries: Jinan University

E-mail: oiss@jnu.edu.cn

Tel: 86-020-85220399

JINAN UNIVERSITY

Game Theory and Business Decision

Lecturer: Talha Harcar

Time: Monday through Friday (June 18, 2018-July 20, 2018)

Office hours: 2 hours (according to the teaching schedule)

Contact Hours: 60 (50mins each)

Credits: 4

Location: MBA Center

Office: MBA Center 107

E-mail: talhaharc@hotm@il.com

Course Description

This is a course on game theory and its application to business strategy. We will develop the basic tools of game theory through lectures and exercises, and we will put the tools to work by applying them to business examples and cases.

Game theory studies competitive and cooperative behavior in strategic environments, where the fortunes of several players are intertwined. It provides methods for identifying optimal strategies and predicting the outcomes of strategic interactions.

The field of game theory began around 1900 when mathematicians began asking whether there are optimal strategies for parlor games such as chess and poker, and, if so, what these strategies might look like. The first comprehensive formulation of the subject came in 1944 with the publication of the book *Theory of Games and Economic Behavior* by famous mathematician John von Neumann and eminent economist Oskar Morgenstern. As its title indicates, this book also marked the beginning of the application of game theory to economics. Since then, game theory has been applied to many other fields, including political science, military strategy, law, computer science, and biology, among other areas. In 1994 three pioneers in game theory were awarded a Nobel Prize, marking the arrival of the field. In 2005, two other prominent researchers in game theory were awarded a Nobel Prize.

Nowadays, the use of game-theory jargon—zero-sum game, Prisoner's Dilemma, win-win game, etc.—is widespread. In this course, we will go beneath the jargon to learn the underlying theory.

Role of Mathematics

Game theory is a mathematical field, and we will use some mathematics in the course. But this does not mean that there will be lots of numbers or techniques. Rather, it means that we will be extremely clear about what we are assuming and about what follows from our assumptions. The ability to be clear in this way can be said, in fact, to be the essence of mathematics! So, think of what we will do as more an exercise in careful logic—with some simple calculations thrown in.

The mathematics in the course shouldn't be a hurdle for anyone.

Course Format

Most classes will have the following format. I will begin by introducing the game theory we will learn that day, going over and expanding on any notes that were assigned. We will then learn the theory by working through the assigned exercises together. We will go over the exercises in detail, making sure not just to calculate but also to understand. After this, we will look at applications of the theory--to business and other areas.

Course Prerequisite:

Principles of Economics is pre-requisite of Game Theory and Business Decision, meaning we would usually expect students have basic understanding of principles of economics before taking Game Theory and Business Decision.

Required Texts

Joseph E Harrington. 2014. Games, Strategies, and Decision Making Hardcover

Course Hours

The course has 25 sessions in total. Each class session is 120 minutes in length. The course meets from Monday to Friday.

Grading Policy

Quiz 1: 10%

Quiz 2: 10%

Midterm: 20%

Final Exam: 20%

Final Paper: 20%

Class Participation 20%

The final paper should be 2500-3000 words in length. You can work in groups of maximum 3 students for the final paper (i.e. papers completed by individuals or groups of 2 is allowed). It should be a game-theoretic analysis of a real-world

situation. The paper should have five sections: (i) a short executive summary; (ii) a short description of the situation being analyzed; (iii) a game model of the situation; (iv) a discussion of the strategies employed by the players; and (v) brief comments on issues outside the scope of the formal model. The emphasis of the paper should be on clear logic rather than lots of calculations.

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90-100
Good	B	80-89
Satisfactory	C	70-79
Poor	D	60-69
Failed	E	Below 60

Academic Honesty

Jinan University defines academic misconduct as any act by a student that misrepresents the students' own academic work or that compromises the academic work of another. scholastic misconduct includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e. misrepresenting as one's own work any work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of the instructors concerned; sabotaging another's work. Within these general definitions, however, Instructors determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties ranging from lowering of their course grade to awarding a grade of E for the entire course.

Schedule

Day 1 and Day 2

Chapter 1: Introduction to Strategic Reasoning

Day 3

Chapter 2: Building a Model of a Strategic Interaction

Day 4

Chapter 3. Eliminating the Impossible: Solving a Game When Rationality Is Common Knowledge

Day 5 to Day 7

Chapter 4. Stable Play: Nash Equilibrium in Discrete Games with Two or Three Players

Chapter 5. Stable Play: Nash Equilibrium in Discrete n -Player Games

Day 8

Chapter 6. Stable Play: Nash Equilibria in Continuous Games

Day 9

Chapter 7. Keep Them Guessing: Randomized Strategies

Quiz 1 (Chapters 1 to 7)

Day 10

Chapter 8. Taking Turns: Sequential Games with Perfect Information

Day 11

Chapter 9. Taking Turns in the Dark: Sequential Games with Imperfect Information

Day 12 and Day 13

Chapter 10. I Know Something You Don't Know: Games with Private Information

Day 14

Midterm (Chapters 1 to 10)

Day 15

Chapter 11. What You Do Tells Me Who You Are: Signaling Games

Day 16 and Day 17

Chapter 12. Lies and the Lying Liars That Tell Them: Cheap Talk Games

Day 18 and Day 19

Chapter 13. Playing Forever: Repeated Interaction with Infinitely Lived Players

Day 20

Chapter 14. Cooperation and Reputation: Applications of Repeated Interaction with Infinitely Lived Players

Day 21 and Day 22

Chapter 15. Interaction in Infinitely Lived Institutions

Quiz 2 (Chapters 11 to 14)

Day 23

Chapter 16. Evolutionary Game Theory and Biology: Evolutionary Stable Strategies

Day 24

Chapter 17: Evolutionary Game Theory and Biology: Replicator Dynamics

Day 25

Final Exam (Chapters 11 to 17)

Final Papers Due