

Lingnan University
The First Term, 2017–2018
CLC 9018: GAMES IN DAILY LIFE

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Cluster Category	Number of Credits	Teaching Hours	Prerequisite(s)
Management and Society	3	3 hours/week	None

“Know strategic reasoning skills through studying real games that have appeared in our life.”

People, organizations, and states interact in various situations, where the actions of each party (people, organization, or state) will affect the interests of the other parties, which can be conflicting or common. Competitive or cooperative situations of this sort are regarded as “games.” To make strategic and rational decisions in game situations, each party needs to understand the rationale behind others’ actions or responses to his or her own decisions. This necessitates the game methods, which underpin how each party can adopt rational strategies in everyday interactions with other parties.

This course presents the concepts, social contexts, and basic methods of games. We use the game-based lecture method to teach how students can undertake strategic reasoning and decision-making in a wide range of social situations. Students will be encouraged and supported—through active engagement in a series of real games and game experiments, and participation in reflective discussions about their game experiences—to develop rational and effective approaches to strategic reasoning and decision-making as players in competitive and cooperative settings.

Course Objective

This course aims to

1. open a new horizon for students to think systematically and act rationally in their social encounters;
2. foster students’ critical thinking and strategic decision-making abilities in interacting with others;
3. strengthen students’ ability to understand and predict others’ decisions and actions in various social situations;
4. enhance students’ awareness of their social responsibilities by helping them understand the impact of their decisions on others and the society;
5. stimulate students’ passion for understanding and engaging in game theoretic reasoning.

Intended Learning Outcomes

Students will be able to

1. apply concepts and tools in game theory to develop game models for social problems that arise in real life;
2. analyze and solve typical puzzles concerning human behavior in game situations;
3. demonstrate logical and rational reasoning and decision-making in game situations;
4. explain how game theory can guide and inform socially responsible interaction with others;
5. recognize and explain the incentives that exist across diverse social settings for people to adopt cooperative strategies with one another.

Course Materials

- **Textbooks:**

1. J. Harrington. “Games, Strategies, and Decision Making.” Worth Publishers, New York, 2009.
2. A. Dixit and S. Skeath. “Games of Strategy,” the second edition, W. W. Norton & Company, New York, 2004.

- **Supplementary Reading List:**

1. L. Fisher. “Rock, Paper, Scissors: Game Theory in Everyday Life.” Basic Book, Philadelphia, 2008.
2. M. Leng and M. Parlar. “Game-Theoretic Analysis of an Ancient Chinese Horse Race Problem.” Computers & Operations Research, Vol. 33, pp. 2033-2055, 2006.
3. P. D. Straffin. “Game Theory and Strategy.” The Mathematical Association of America, Washington, D. C., 1993.

Teaching Method

The course is designed to generate student engagement by augmenting video-enhanced lectures with tasks involving game puzzles, problems, experiments and projects, and reviewed through interactive discussions with students.

Mark Distribution

Class Attendance and Experiment Participation	30%
Individual Game Assignments	20%
Final Exam	50%

Course Schedule (Tentative)

We apply the game-based teaching method to this course, in which students will learn practical game theoretic concepts and tools through studying **42 real-life games** in five application disciplines; see a summary below.

Discipline	Real Life Games in Our Study
Business and Economics	(1) The Cigarette Advertising Game; (2) The Telephone Game;
	(3) The Market Entry Game; (4) The Revised Market Entry Game; (5) The Employee Monitoring Game; (6) The VLA Market Game; (7) The Telecom Game (CrossTalk vs. GlobalDialog).
History	(1) Tianji's Horse Race (An Ancient Chinese Story); (2) Galileo Galilei and the Roman Inquisition.
Politics and International Relations	(1) The World War I; (2) The U.S. Debt Game; The Political Power of a Party.
Sociology	(1) The Classical Prisoner's Game; (2) The Golden Balls Game (A British TV show); (3) The Revised Golden Balls Game; (4) The Stag Hunt Game; (5) The Revised Stag Hunt Game; (6) The Party Arrival Time Game; (7) The Seating Game; (8) The Shooting of Trayvon Martin; (9) The Driving Convention Game; (10) The Dating Game; (11) The Battle of Sexes; (12) The Game of Chicken; (13) The Revised Chicken Game; (14) The IRS Audits; (15) The Paper-Rock-Scissors Game; (16) The Slash 'EM Up Game; (17) The Kidnapping Game; (18) The Revised American Idol Fandom; (19) The American Idol Fandom; (20) The Ultimate Game; (21) The Centipede Game; (22) The Murder of Kitty Genovese; (23) The Ranger Inspection Game; (24) The Division of an Ice Cream; (25) The Marriage Contract Problem.
Sports	(1) The Tennis Match Game (Evert vs. Navratilova); (2) The Soccer Penalty Kicks; (3) The Olympic Drug Test Game; (4) The American Football Game.

We will model the above real-life games in three most important game formats: (i) simultaneous-move non-cooperative games, (ii) sequential-move non-cooperative games, and (iii) cooperative games. Our game-based teaching method is expected to help students understand what the games in real life are and how real-life games can be solved using game theory.

- Chapter 1: Games in Real Life and Game Theory: An Introduction
 - Learn basic concepts in game analysis.
 - **Real Game examples** (1) Penalty Kicks in Soccer Games; (2) The Princess Bride (Movie, 1987); (3) The Golden Balls Game (A British TV show); (4) Price-Matching Guarantee Games; (5) Weapons of Mass Destruction; and (6) Galileo Galilei and the Roman Inquisition.
- Chapter 2: Simultaneous-Move Games: Pure Nash Equilibrium (Part I: The Prisoner's Dilemma)
 - Analyze all **real** games in which players experience the “prisoner's dilemma.”
 - **Real Games that We Study in Chapter 2** (1) Tianji's Horse Race (An Ancient Chinese Story); (2) The Classical Prisoner's Game; (3) The Golden Balls Game (A British TV show); (4) The Cigarette Advertising Game; and (5) The World War I.

- Chapter 3: Simultaneous-Move Games: Pure Nash Equilibrium (Part II: The Trust Dillema)
 - Analyze all **real** games in which players experience the “trust dillema.”
 - **Real Games that We Study in Chapter 3** (1) The Stag Hunt Game; (2) The Party Arrival Time Game; (3) The Seating Game (the Grant Café in New York); (4) The Shooting of Trayvon Martin; (5) The Driving Convention Game; (6) The Dating Game; (7) The Battle of Sexes; (8) The Telephone Game; (9) The Game of Chicken; and (10) The American Idol Fandom.
- Chapter 4: Simultaneous-Move Games: Mixed Strategy (Part I: Games with No Pure Strategy in Equilibrium)
 - Analyze all **real** games in which players cannot find any pure strategy in equilibrium.
 - **Real Games that We Study in Chapter 4** (1) The Employee Monitoring Game; (2) The Tennis Match Game (Evert vs. Navratilova); (3) The Soccer Penalty Kicks; (4) The IRS Audits; (5) The Olympic Drug Test Game; (6) The Paper-Rock-Scissors Game; and (7) The Slash 'EM Up Game.
- Chapter 5: Simultaneous-Move Games: Mixed Strategy (Part II: Game with Multiple Pure Strategies in Equilibrium)
 - Analyze all **real** games in which players have multiple pure strategies in equilibrium.
 - **Real Games that We Study in Chapter 5** (1) The Stag Hunt Game; (2) The Golden Balls Game; (3) The Revised Chicken Game; (4) The American Idol Fandom Game; (5) The Market Entry Game; and (6) The Murder of Kitty Genovese.
- Chapter 6: Taking Turns: Sequential-Move Games with Perfect Information
 - Analyze all **real** games in which players make their decisions sequentially.
 - **Real Games that We Study in Chapter 6** (1) The Very Large Airplanes (VLA) Market Game; (2) The Ranger Inspection Game; (3) The Kidnapping Game; (4) The U.S. Debt Game; (5) The Ultimate Game; and (6) The Centipede Game.
- Chapter 7: Combining Sequential and Simultaneous Moves.
 - Analyze all **real** games in which players make their decisions at two or more stages. At each stage, players may simultaneously or may sequential make decisions.
 - **Real Games that We Study in Chapter 7** (1) The Market Entry Game; (2) The Telecom Game (CrossTalk vs. GlobalDialog); and (3) The American Football Game.
- Chapter 8: Cooperative Games
 - Analyze all **real** games in which players cooperate to enjoy a higher benefit and then bargain over the fair allocation of the extra benefit among them.

- **Real Games that We Study in Chapter 8** (1) The Division of an Ice Cream; (2) The Political Power of a Party in a Multi-Party Legislature; and (3) The Marriage Contract Problem.

- **Final Examination** (TBA).

Measurement of Learning Outcomes

Learning Outcomes	Class Attendance and Experiment Participation	Individual Game Assignments	Written Final Exam
1. Apply concepts and tools in game theory to develop game models for social problems arising in real life.	✓	✓	
2. Analyze and solve typical puzzles concerning human behavior in game situations		✓	✓
3. Demonstrate logical and rational reasoning and decision-making in game situations.	✓	✓	✓
4. Explain how game theory can guide and inform socially responsible interaction with others.	✓		
5. Recognize and explain the incentives that exist across diverse social settings for people to adopt cooperative strategies with one another.	✓		

1. **Class Attendance and Experiment Participation:** In classes, students are required to analyze real competition- or cooperation-related problems, develop corresponding game models, and find solutions. This can help assess students' ability of using game theory in real life (Learning Outcome 1). Moreover, through the in-class experiments (e.g., Rock, Paper, Scissors), students can demonstrate and improve their logical and rational reasoning and decision-making ability (Learning Outcome 3). We use the results of students' game experiments to show the applications of game theory (Learning Outcome 4). In some group game experiments, students will identify their roles and responsibilities in games (Learning Outcome 5).
2. **Individual Game Assignments:** Students will individually complete several after-class game assignments, which help students understand the game-theoretic skills for solving interactive problems. In these assignments, students are required to (i) identify and model game

problems (Learning Outcome 1), (ii) analyze all game players' possible strategies (Learning Outcome 2), and (iii) solve the game models and find the decisions for players (Learning Outcome 3).

- 3. Written Final Exam.** The close-book final exam mainly includes 5—7 game problems that are suitable to undergraduate students. For each game problem, students are required to develop a corresponding model and identify game players' possible strategic actions and payoffs (Learning Outcome 2) and analyze the logical and rational process to find a decision for each game player (Learning Outcome 3).

We can conclude from the above that this course can effectively guide students to think and behave rationally (Learning Outcomes 1, 2, 3, and 4), strategically (Learning Outcomes 1, 2, 3, and 4), and systematically (Learning Outcome 5) about interactive phenomena.