

《Game Theory and Economics of Information》 Course Syllabus

Course Chinese Title: 博弈论与信息经济学	Course Category (Compulsory/ Elective) : Elective
Total Hours/ Hours Per Week/ Credit(s): 32/2/2	Lab Practice/ Practical Hours: None
Prerequisites: Microeconomics, Advanced Mathematics	
Follow-up course: Business Strategy; Industrial Economics	
Time: 08:30-10:10 Monday	Classroom: Room 3302, Guangcheng Campus
Class: International Economics and Trade (International Business Industry-University International Program) 2021 class	
College: School of Economics and Management	
Instructor Name/ Academic Title: Joseph Chih-Yuan Hung/ Lecturer	
Office Hour: 10:15-11:25 Monday at Room 2303, Guancheng Campus/ Online: WeChat group	
Course Assessment Method: Open book test () Close book test () Report (✓) Other (✓), see Assessment and Grading table below	
Required Textbook: None, lecture notes and slides will be delivered before every meeting.	
Supplementary Material: None.	
<p>Course Description:</p> <p>Game Theory, also known as Strategic Decision Theory, is the analysis of situations in which the payoff of a decision maker depends not only on his own actions but also on those of others. Game Theory has applications in several fields, such as economics, politics, law, biology, and computer science. In this course, we will introduce the basic tools of game theoretic analysis. In the process, I will outline some of the many applications of Game Theory, primarily in industrial economics and international business.</p> <p>Economics of Information, or contract theory, deals with moral hazard (also called hidden action) and adverse selection (also called hidden information) have been a long-time concern for insurance. These situations refer to informational asymmetries related to the agent's behavior during the relationship or to the agent's characteristic when signing the contract. This part of course provides an overview of the main topics in contract theory. We will start from the baseline models and then look at various modifications including more general structure of outcomes or types, simple models that allow building set-ups to analyze particular applications, limited liability considerations, behavioral elements, etc. We will also present some applications where economics of information has been extensively and fruitfully used.</p>	

Game Theory and Economics of Information has emerged as a branch of mathematics and is still quite mathematical. My emphasis will be on the conceptual analysis and applications, keeping the level of mathematical technicalities to a minimum, especially at a level that should be quite acceptable to the average college student.

Course Learning Objectives and its supporting on the requirement for graduation:

Course Learning Objectives	Measurements on Requirement for Graduation	Requirement for Graduation
<p>CO1: Understand the important factors in the strategic situation, such as equilibrium and its refinements, the distinguish between action and strategy, the problem and resolutions of asymmetric information and their impact on the market economy.</p>	<p>LO 1.1 Students shall have basic theoretical knowledge and professionalism of Humanities and Social Science.</p>	<p>CG1 Students shall master the knowledge required by Applied Economics systemically.</p>
<p>CO2: Apply the various solution concepts and optimal/second best solutions in the economic models on the questions of management and market competition.</p>	<p>LO 2.3 Students shall be familiar with using existing analysis tools to solve the problems in positive economics and management practice.</p>	<p>CG2 Students shall be able to analyze problems with using quantitative and information technology (IT) tools.</p>

<p>CO3: Recognize the possibility and importance of cooperation and coordination in daily life. Further, analyze the strategic and asymmetric information problems, such as principal-agent problem, coordination games, cooperation in prisoner's dilemma, etc., in a modeling thinking way to eliminate conflict in team and improve the wellbeing of related groups.</p>	<p>LO 4.3 Students shall be able to consider the influence of behavior on others and society and guide own behavior according to ethical and moral principles.</p>	<p>CG4 Students shall observe the basic moral principles and provide the humanistic cares.</p>
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Lecturing Plan

Week	Topic	Instructor	Hours	Contents (Key point, Difficulty, Ethical and political learning)	Instructional Mode (Online/ Blended/ Offline)	Activities	Assignment	Supported Measurements
1	Introduction	Chih-Yuan Hung	2	<p>Key points: Overall introduction to the game theory and economics of information</p> <p>Difficulties: categories of games and the connection and distinction between games and contracts.</p> <p>Ethical and Political Learnings: introduce the great person in the history of game theory and economics of information, emphasize the impact on the human beings.</p>	Blended	Lecture/ Discussion/ Experiment I: risk and probability	Reading: unit 1	CO3

2	Game Models Basics I	Chih-Yuan Hung	2	<p>Extensive form and strategic form game</p> <p>Key points: game tree; matrix of the game.</p> <p>Difficulties: the distinction between outcome and payoff, action and strategy; regularity of extensive form.</p> <p>Ethical and Political Learnings: introduce the problem faced by a typical game player. Students will recognize the strategical interaction problems and be asked find cases/examples in the Chinese literature to prove that game theoretical thinking was also part of the Chinese culture, especially in the ancient politics.</p>	Offline	Lecture	<p>Reading: Unit 2</p> <p>Homework for Ethical and Political Learnings: Read a Chinese article in history related to strategic interaction.</p> <p>Due: week 5</p>	CO1
3	Game Models Basics II	Chih-Yuan Hung	2	<p>Beliefs, Knowledge and Information</p> <p>Key points: Common knowledge; uncertainty in game.</p> <p>Difficulties: the understanding and application of common knowledge; incomplete information and imperfect information.</p>	Offline	Lecture/ Discussion/ Experiment II: How do you know what I know?	Reading: Unit 2	CO1
4	Solution Concepts I	Chih-Yuan Hung	2	<p>Dominant strategy and Nash Equilibrium</p> <p>Key points: rationality and dominance in strategy; definition of Nash equilibrium</p> <p>Difficulties: understanding behind the definition of Nash equilibrium</p>	Offline	Lecture	Reading: Unit 3 Problem set 1	CO2
5	Holiday	-	2	-		-	Reading: Unit 4	-

6	Solution Concepts II	Chih-Yuan Hung	2	<p>Backward Induction and Subgame Perfection</p> <p>Key points: solutions in extensive form games with complete information</p> <p>Difficulties: distinguish between backward induction and subgame perfect Nash equilibrium.</p>	Offline	Lecture	Reading: Mathematical Appendix	CO2
7	Solution Concepts III	Chih-Yuan Hung	2	<p>Solutions for static games with incomplete information</p> <p>Key points: Bayesian Nash Equilibrium</p> <p>Difficulties: Calculate the probability of outcomes and expected payoffs</p>	Offline	Lecture	Reading: Unit 5 Assignment 2	CO2
8	Solution Concept IV	Chih-Yuan Hung	2	<p>Dynamic games with incomplete information</p> <p>Key points: Sequential Equilibrium and Refinements</p> <p>Difficulties: sequential rationality and Bayesian updating of beliefs.</p>	Offline	Lecture/ Discussion	Reading: Unit 5	CO2
9	Introduction to Behavioral Games	Chih-Yuan Hung	2	<p>Key points: Social preference; Intension, reciprocity and trust; Bounded rationality</p> <p>Difficulties: modeling the psychological games and the ability to prediction of bounded rationality models</p>	Offline	Lecture	Reading: Appendix 2	CO3
10	Economics of Information	Chih-Yuan Hung	2	<p>Basic Model</p> <p>Key points: graph of time line used in economics; optimal choice under strategic situation and uncertainty</p>	Offline	Lecture	Reading: Unit 6	CO1

				Difficulties: calculation the first best and second best solution for constrained maximization problem.				
11	Asymmetric Information I	Chih-Yuan Hung	2	Adverse Selection Key points: market of lemon. Difficulties: understanding the implication of adverse selection in financial markets.	Offline	Lecture/ Experiments III: Price-quality game	Reading: Unit 8	CO1
12	Asymmetric Information II	Chih-Yuan Hung	2	Screening Key points: incentive compatibility and its application Difficulties: solving the unbinding constraints for the optimal problem.	Offline	Lecture	Reading: Unit 9 Assignment 3	CO2
13	Principal-Agent Problem	Chih-Yuan Hung	2	Moral Hazard and other problems Key points: understanding the main conflict withing the principal-agent problem and the constraints in the principal-agent model. Difficulties: Understanding the impossibility of finding second best solution for continuous effort model. Ethical and Political Learnings: through this lecture, students will recognize the origin of the conflict between employer and employee. Students will learn the method to mitigate this conflict and recognize no effort no lunch.	Offline	Lecture	Reading: Unit 7	CO4

14	Mechanism Design	Chih-Yuan Hung	2	<p>Auction and Matching</p> <p>Key points: different auction format; definition and solving for stable matching</p> <p>Difficulties: calculate the optimal bidding function for first price sealed bid auction.</p>	Offline	Lecture/ Experiments IV	Reading: unit 10 Assignment 4	CO4
15	Presentation I	Chih-Yuan Hung	2	<p>Group presentation for final project.</p> <p>Key points: summary of the ideas in class, report the main finding.</p> <p>Difficulties: group cooperation and coordination</p> <p>Ethical and Political Learnings: Cooperation and Sharing ideas are key characteristics for a good financial worker. How to share the loading of assigned jobs in a group project properly is a of learning in major of international business.</p>	Offline	Student Presentation	None	CO4
16	Presentation II	Chih-Yuan Hung	2	<p>Group presentation for final project.</p> <p>Key points: summary of the ideas in class, report the main finding.</p> <p>Difficulties: group cooperation and coordination</p> <p>Ethical and Political Learnings: Cooperation and Sharing ideas are key characteristics for a good financial worker. How to share the loading of assigned jobs in a group project properly is a of learning in major of international business.</p>	Offline	Student Presentation	None	CO4

	Total:	32				
Grading						
Course Learning Objectives	Measurements on Requirement for Graduation	Assessments and Grading Percentage (%)			Percentage (%)	
		Homework (4 problem sets and one short essay)	Discussion	Final Term Paper		
CO1	2-3	10	10	15	35	
CO2	4-3	10	5	15	30	
CO3	7-2	15	0	20	35	
Total		35	15	50	100	
<p>Note: (1) According to examination regulations of DGUT, students who have missed 3 classes (or 6 hours) are not allowed to take the final examination of the course. (2) Homework is assessed according to the design of problem sets; for other assessment, refers to the rubrics in Appendix below</p>						
Syllabus Submission Date: 2022.08.20						

School Reviewal:

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Signature:

Data:

Appendix: Grading Criteria Rubrics

Discussion

Measurement	Criteria			
	A (100)	B (85)	C (70)	D (0)
Preparedness (CO1, 66%)	<ol style="list-style-type: none"> 1. Always prepared for class with assignments and required materials 2. Accurately expresses foundational knowledge pertaining to issues raised during the discussion 	<ol style="list-style-type: none"> 1. Usually prepared with assignments and required materials 2. Expresses basic foundational knowledge pertaining to class discussions 	<ol style="list-style-type: none"> 1. Seldom prepared with assignments and required materials 2. Expresses limited foundational knowledge pertaining to class discussions 	<ol style="list-style-type: none"> 1. Consistently unprepared for class 2. Expresses no relevant foundational knowledge
Engagement (CO2, 34%)	<ol style="list-style-type: none"> 1. Contributes to class activities by offering quality ideas and asking appropriate questions on a regular basis 2. Actively engages others in class discussions by inviting their comments 3. Constructively challenges the accuracy and relevance of statements made 4. Effectively identifies and summarizes main points 	<ol style="list-style-type: none"> 1. Contributes to class activities by offering ideas and asking questions on a regular basis 2. Often engages others in class discussions by inviting their comments 3. Challenges the accuracy and relevance of statements made 4. Identifies and summarizes main points 	<ol style="list-style-type: none"> 1. Occasionally contributes to class activities by offering ideas and asking questions 2. Sometimes engages others in class discussions 3. Sometimes has an understanding of main points 4. Identifies and summarizes some of the main points 	<ol style="list-style-type: none"> 1. Fails to contribute to class activities 2. Fails to invite comment/opinions from other students 3. Demonstrates little understanding of main points 4. Does not identify or summarize main points

Final Term Paper

Measurement	Criteria			
	A (100)	B (85)	C (70)	D (0)
Integration of Knowledge (CO1, 15%)	The paper demonstrates that the author fully understands and has applied concepts learned in the course. Concepts are integrated into the writer's own insights.	The paper demonstrates that the author, for the most part, understands and has applied concepts learned in the course.	The paper demonstrates that the author, to a certain extent, understands and has applied concepts learned in the course.	The paper does not demonstrate that the author has fully understood and applied concepts learned in the course.
Support (CO1, 15%)	Begins to offer reasons to support its points, perhaps using varied kinds of evidence. Begins to interpret the evidence and explain connections between evidence and main ideas. Its examples bear some relevance.	Often uses generalizations to support its points. May use examples, but they may be obvious or not relevant. Often depends on unsupported opinion or personal experience, or assumes that evidence speaks for itself and needs no application to the point being discussed. Often has lapses in logic.	Depends on cliches or overgeneralizations for support, or offers little evidence of any kind. May be personal narrative rather than essay, or summary rather than analysis.	Uses irrelevant details or lacks supporting evidence entirely. May be unduly brief.
Discussion and Analytics (CO2, 15%)	In-depth discussion & elaboration in all sections of the paper.	In-depth discussion & elaboration in most sections of the paper.	The writer has omitted pertinent content or content runs-on excessively. Quotations from others	Cursory discussion in all the sections of the paper or brief discussion in only a few sections.

			outweigh the writer's own ideas excessively.	
<p>Organization (CO2, 15%)</p>	<p>Shows a logical progression and modeling thinking of ideas and uses fairly sophisticated transitional devices; e.g., may move from least to more important idea. Some logical links may be faulty, but each paragraph clearly relates to paper's central idea. The writer provides concluding remarks that show analysis and synthesis of ideas.</p>	<p>May list ideas or arrange them randomly rather than using any evident logical structure. May use transitions, but they are likely to be sequential (first, second, third) rather than logic-based. While each paragraph may relate to central idea, logic is not always clear. Paragraphs have topic sentences but may be overly general, and arrangement of sentences within paragraphs may lack coherence. Some of the conclusions, however, are not supported in the body of the paper.</p>	<p>May have random organization, lacking internal paragraph coherence and using few or inappropriate transitions. Paragraphs may lack topic sentences or main ideas, or may be too general or too specific to be effective. Paragraphs may not all relate to paper's thesis.</p>	<p>No appreciable organization; lacks transitions and coherence.</p>
<p>Presentation and Cooperation (CO3, 40%)</p>	<ol style="list-style-type: none"> 1. Does a full share of work or more. 2. Assigns a clearly defined role; group members perform roles 	<ol style="list-style-type: none"> 1. Does an equal share of work 2. Assigns roles, but roles are not clearly defined or 	<ol style="list-style-type: none"> 1. Does almost as much work as others 2. Assigns roles, but roles 	<ol style="list-style-type: none"> 1. Does less work than other group members 2. No effort made to assign

	<p>effectively</p> <ol style="list-style-type: none"> 3. Always considers all views and helps team to reach fair decision 4. Never argues with teammates 5. Group tries to solve its problems by itself without seeking outside help 	<p>consistently adhered to</p> <ol style="list-style-type: none"> 3. Usually considers all views and helps team to reach fair decision 4. Rarely argues 5. Group seldom solves its problems as a team and asks classmates or teacher for help 	<p>are not adhered to</p> <ol style="list-style-type: none"> 3. Often sides with friends instead of considering all views 4. Sometimes argues 5. Group settles problems and gives up easily 	<p>roles to group members</p> <ol style="list-style-type: none"> 3. Acts as cliques or individuals rather than group 4. Arguments within group 5. Little attempt to solve problems; gives up easily
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