National Taiwan University of Science and Technology

2019 Summer Program

ECON 316 Game Theory

Course Outline

Term: July 01-August 02,2019

Class Hours: 18:00-19:50 (Monday through Fridays)

Course Code: ECON 316

Instructor: Ali Toossi

Home Institution: University of Illinois at Urbana Champaign

Office Hours: 13:00-14:00 (Tuesdays/Wednesdays)

Email: atoossi@gmail.com

Credit: 4

Class Hours: According to the regulations of Minister of Education, R.O.C, 18 class hours could be counted as 1 academic credit in all universities in Taiwan. This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

Course Description

Applications of game theory are ubiquitous in the real world. The following are just some examples: A firm bargains with its workers; two firms compete with each other in a market; a group of countries decide how much resources to spend for defense against a common enemy; candidates for political office decide which political platforms to propose; oil companies decide how much to bid for an offshore oil tract of uncertain value in a sealed-bid auction. In situations such as these, the actions of any one agent have consequences for other agents, and for this reason, agents need to think strategically: What will my opponents do, and how does this in influence my optimal action? Game theory is used to analyze strategic interaction between

economic agents. In this course, we introduce game theoretic concepts and apply them to a variety of topics.

Required Textbooks:

The course is primarily based on the content presented during classes. Some good optional references are:

Games of Strategy. Dixit, Skeath & Reiley Jr. W.W. Norton (2015)

Game Theory for Applied Economists. Robert Gibbons. Princeton University Press (1992)

Strategy and Game Theory. Munoz-Garcia & Toro-Gonzalez. Springer(2018)

Grading & Evaluation:

Game Theory is a class that requires a lot of practice. During the class, we will cover a lot of material and many different concepts. Homework are a good way to learn these new concepts and to stay up-to-date with all the material.

Homework (30%) Midterm Exam (30%) Final Exam (40%)

94-100 = A	90-93 = A-	86-89 = B+	82-85 = B	80-82 = B-	76-79 = C+
72-75 = C	70-72 = C-	66-69 = D+	62-65 = D	60-62 = D-	Below 60 = F

Course Schedule:

Week1

Session 1	Classifying games: Do the payers have full or equal information? Are the players' interest in total conflict, or is there some commonality? Are agreements to cooperate enforceable? Are the moves in the game sequential or simultaneous? Terminology & assumptions Strategy, payoffs, rationality,
Session 2	Terminology & assumptions equilibrium, Pareto efficiency Simultaneous Games with pure strategies: Discrete Strategies *Normal-form Games; Dominant strategies, iterated Elimination of strictly dominated strategies; Nash equilibrium;*

Session 3	*Applications & Examples*: Prisoner's Dilemma, Pure coordination games, Assurance Games, Battle of sexes, Games of Chicken
Session 4	Simultaneous Games with pure strategies: Continuous Strategies Price competition, Cournot game, Games with positive externality, Political campaign advertising, Hoteling model

Homework 1

Week2

Session 1	Simultaneous Games with Mixed Strategies Rules of Probability, expected utility Attitudes towards risk & expected utility
Session 2	Simultaneous Games with Mixed Strategies NE in mixed strategies Assurance, pure coordination & battle of sexes, Game of chicken, Lobbying game
Session 3	*Two-Stage Games of Complete but Imperfect information:* *Extensive-form representation, Subgame perfection, Backward induction;*
Session 4	*Application & Examples:* Stackelberg with two firms, wages & employment in a unionized firm, Bank runs,

Homework 2

Week3

Session 1	*Application & Examples:* Electoral competition, trust & reciprocity, Tariff & support of infant industry
Session 2	Prisoner's Dilemma & Repeated Games Finite repetition Infinite repetition *Application & Examples:* Implicit collusion
Session 3	Collective action Games Collective action as Prisoner's Dilemma Collective action as Chicken Collective action as Assurance
Session 4	Collective action problems in large groups

Review & Midterm

Week4

Session 1	Evolutionary Games The framework, Segregation model
Session 2	Evolutionary Games Segregation model
Session 3	Bargaining
Session 4	Bargaining

Homework 3

Week5

Session 1	Games of Incomplete information
Session 2	Games of Incomplete information
Session 3	Auctions
Session 4	Auctions

Final Exam