Game Theory with Applications
賽局理論與應用

Instructor: 洪一薰 I-Hsuan Hong

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Class time: Thursdays, 1:20 pm-4:20 pm
Class website: ceiba website

Course description and objectives:
This course is designed to help students connect game theory with practices in issues of supply chains, industrial economics, or some related topics in decentralized systems, where individual entrepreneurs have their own profit functions and often are unwilling to reveal their own information to each other or the public. In this course we will study the interactions between multiple players (decision makers). Such problems arise frequently in supply chain applications. The interaction of a firm with its competitors, customers and suppliers can be modeled as a game, and hence, our main tool of analysis in this course will be Game Theory. Course goals will be accomplished through lectures, homework and readings. Lectures will emphasize the theoretical aspects of the field, and homework will focus on problem solving skills.

Tentative outline:
1. Introduction to game theory
2. **Static games of complete information** (normal-form representation, Nash equilibrium, mixed strategies, Cournot and Bertrand models)
3. **Dynamic games of complete information** (backwards induction, Stackelberg model, subgame)
4. **Static games of incomplete information** (Static Bayesian games and Bayesian Nash equilibrium)
5. Introduction to **dynamic games of incomplete information**
6. Game theory application: pricing, competition in multi-echelon supply chains

Course requirements:
Homework will be assigned approximately once every two weeks. Homework will be posted on the course website with associated due dates. Late assignments will be accepted only in case of unavoidable occurrences. You are encouraged to discuss homework and learn from each other, but each person must submit his/her own work, unless the homework specifically indicates that you should work in groups.
There are two midterm exams and final exam. All of exams of this course are closed-notes and closed-book, but you are allowed to bring **one-page (A4-sized, double-sided)** of "cheat sheet" filled with equations or whatever you want in compressed writing or typing. **You need to prepare the cheat sheet on your own. Copying from others is prohibited.**

Grading:
Homework: 10%, Midterm 1: 30%, Midterm 2: 30%, Final Exam: 30%

Course and exam schedule:
Tentative schedule of midterms and final: Midterm 1: October 20; Midterm 2: December 1; Final exam: January 12
The exam time is typically 2-hour long.

References:
Game Theory for Applied Economists by Robert Gibbons, Princeton University Press (1992)
Game Theory by Drew Fudenberg and Jean Tirole, MIT Press (1991)
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