ECON5160 Game Theory

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Department of Economics
Chinese University of Hong Kong

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Course Description

This course focuses on game theory and its applications in economics. I will first introduce various solution concepts in strategic and extensive games of complete or incomplete information. Then, I will cover repeated games. For those interested in applied theory, I will also cover linear quadratic games and supermodular games, which are extensively used in applied works.

Learning Outcomes

After completing this course, the students are expected to:

1. Acquire advanced knowledge in game theory;
2. Develop skills in game theoretic modeling and analysis;
3. Understand how to incorporate social networks into game theory;
4. Obtain preparations for conducting independent research in game theory.

Recommended Textbooks

There is no required textbook for this course. The lecture is mainly based on the following books.

1. Michael Maschler. Eilon Solan, and Shmuel Zamir, *Game theory*, Cambridge, 2020
2. D. Fudenberg and J. Tirole, *Game theory*, MIT, 1991.
3. M. Osborne and A. Rubinstein, *A course in game theory*, MIT, 1994.

Assessment Scheme

The course grade will be determined by assignments (20%), a midterm exam (40%), and a final exam (40%). The assignment of grades will be based on the following descriptors.

Grade	Descriptor
A / A-	Outstanding/Generally outstanding performance on all learning outcomes.
B+ / B / B-	Substantial performance on all learning outcomes, OR high performance on some learning outcomes which compensates for less satisfactory performance on others, resulting in overall substantial performance.
C+ / C / C-	Satisfactory performance on the majority of learning outcomes, possibly with a few weaknesses.
D+ / D	Barely satisfactory performance on a number of learning outcomes
F	Unsatisfactory performance on a number of learning outcomes, OR failure to meet specified assessment requirements.

Academic Honesty

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/

Course Outline (tentative)

1. Strategic Games (4weeks)

Nash Equilibria in Pure and Mixed Strategies, Rationalizability and Iterated Elimination of Strictly Dominated Strategies, Bayesian Games, Correlated Equilibrium, Common Knowledge

2. Extensive Games (3weeks)

Backward Induction, Subgame Perfect Equilibrium, Weak Perfect Bayesian Equilibrium, Sequential Equilibrium, Trembling-Hand Perfect Equilibrium, Proper Equilibrium

3. Repeated Games (3weeks)

Folk Theorems for Finitely and Infinitely Repeated Games, Finite Automaton and Complexity Considerations in Repeated Games, Community Enforcement

4. Linear Quadratic Games and Supermodular Games (2 weeks)

Equilibrium Existence and Uniqueness, Application to Network Games and Global Games