Department of Economics, HKUST
ECON 4999T Economics of Uncertainty and Information
Course Outline

Instructor

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Office: LSK 6069
Office hours: Fridays 4:00 - 5:30p.m. (Zoom meeting code: 225 338 8641)
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Course Webpage: https://canvas.ust.hk
Lecture time: Mondays 4:30-5:50 p.m. & Fridays: 12:00 - 01:20 p.m.
Lecture venue: Zoom through Canvas

Teaching Assistant

Hsu, Ke-cheng
Office hours: Tuesdays 2:00-4:00 p.m. (Zoom meeting code 928 2281 4545)
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Tutorial time: Tuesdays 6:00 - 6:50p.m.
Tutorial venue: Zoom through Canvas

Course Description, Objectives and Learning Outcomes

All human endeavors are constrained by limited knowledge – about the laws of nature, external events in the past, present and future, how other people (including ourselves) are going to behave, etc. Life is filled with decision problems without perfect information of their consequences. In view of these, research on the decision making and strategic interaction under risk and uncertainty have been extremely active for the past few decades. This course aims to provide an introduction to this exciting field of research and suggestions for further exploration. The first part of the course is devoted to the economics of uncertainty and covers topics including the expected-utility model, market allocation of risks and asset pricing. The second part of the course is devoted to the economics of information and covers topics including moral hazard, mechanism design, and information aggregation in the market.

Per Program Intended Learning Objective (PILO) for BSc in Economics and Finance, upon completing the course, students are expected to be able to

- Understand the logic, scientific basis, and critical thinking of economic analyses (PILO 1)
- Apply frameworks and concepts in information economics to explain rationales for commonly observed social and business phenomena (PILO 4);

- Apply frameworks and concepts in information economics and game theory to explain the reasoning behind strategic interactions among agents and make predictions concerning the outcomes of the interactions (PILO 4);
- Identify distortions and inefficiency arising from misalignment of interests between individual agents and the total welfare, and implications for policy intervention (PILO 8);
- Develop simple theoretical models and apply them to analyze current business issues (PILO 9).

Reference Books

The primary learning materials are lecture and lecture notes. All lectures will be recorded and posted on Canvas after class. Lecture notes/slides will be posted a few days prior to the lecture for preview.

The following books provide excellent coverage of topics discussed in the course.

- Asset Pricing
  - *Intermediate Financial Theory* by J. Danthine and J. Donaldson, 2014, Academic Press. (Available online through HKUST library)
- Game Theory and its Applications
  - *Game Theory: An Introduction* by S. Tadelis, 2013, Princeton University Press. (Basics)
  - *Rational Herds: Economic Models of Social Learning*, by C. Chamley, 2004, Cambridge University Press.
- Mechanism and Contract Design
  - *Contract Theory* by P. Bolton and M. Dewatripont, 2005, MIT Press
  - *An Introduction to the Economics and Information: Incentives and Contracts*, by I. Macho-Stadler and D. Perez-Castrillo, 1995, Oxford University Press

Prerequisite

Econ 3014 Managerial Microeconomics,
or
Econ 3113 Microeconomic Theory I & Econ 3133 Microeconomic Theory II
Basic calculus and algebra is expected.

Assessment

Participation (5%)

You are expected to behave civilly in lectures, tutorial sessions, and office hours. Common-sense classroom etiquette, such as turning up on time and showing respect to the instructor and fellow students, is expected.

Problem Set (15%)

There are five problem sets. The score of the lowest one will be dropped. Group study/discussion is encouraged, but you have to turn in **your own written answers (**word-to-word copying is **not accepted)**. Grading of problem sets is based on effort instead of accuracy.

Please submit your homework online at canvas.ust.hk, and make sure it is completely and successefully uploaded. Full solutions will be posted on Canvas, and more challenging questions will be discussed in tutorials.

Midterm Test (25%)

The midterm test is tentatively scheduled on **April 9** during the regular lecture time. The style and format is similar to questions in problem sets.

There is **no make-up test**. Students who miss the midterm test with a legitimate and documented reason will have the weight of the midterm test transferred to the final exam. Missing the test without a legitimate and documented reason will result in zero marks.

Final Examination (55%)

The final exam is **cumulative**. The style is similar to the midterm exam. The style and format is similar to questions in problem sets.

The exam is centrally administered during May 15-28 and the date and time will be announced by the ARR.

Regrading

In order to avoid problems associated with self-selection (grading mistakes that increase and decrease scores can happen, but only the one that decrease scores will be reported), disputes on individual questions will result in re-grading of the entire exam by the instructor. The re-graded score will be final and it may be higher or lower than the original one. Requests for re-grading must be submitted in writing to the instructor within one week since the score is first published.

Academic Honesty and Integrity

Academic integrity and honesty are key values of HKUST. Cheating and plagiarism are treated with **zero tolerance**. Please read the information on academic integrity carefully. It is your responsibility to be familiar with the Academic Honor Code and the content on the Academic Integrity website (http://www.ust.hk/provost/integrity). The Code is to be **strictly enforced**. All cheating cases are to be reported to the University **without exception**.

Outline and Schedule

1. Decision-making under uncertainty (3 lectures)
    - Expected utility
    - Risk preference
    - Optimal risk bearing
2. Market allocation of risk (4 lectures)
    - Contingent-claim market
    - Asset market
    - CAPM
3. Information processing and game theory(3 lecture)
    - Representing information
    - Belief updating
    - Games with private information
    - (Perfect) Bayesian equilibrium
4. Applications (6 lectures)
    - Bargaining
    - Auction
    - Global games and beauty contests
    - Information cascade
    - Communication
5. Mechanism design (5 lectures)
    - Revelation principle

- Designing efficient mechanisms
- Designing revenue-maximizing mechanisms

6. Moral hazard (2 lectures)

    - Risk-incentive tradeoff
    - Multitasking
    - Dynamic incentives and Career concern