

CORE1251 Optimizing Decisions for Personal and Business Development

Expected Learning Outcomes and Course Objectives

- Learn basic knowledge of different optimization tools and their applications. The tools will be useful for solving many problems in personal life and business development.
- Identify and define real-life personal and business problems, and then solve them using optimization tool taught in class.
- Understand the impact of optimization in a global and societal context and on a broad range of issues.

Instructor and Teaching Assistants

Instructor

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TA

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Course Description

Decision making will play an important role in students' personal and professional development in their lifelong pursuit of excellence. Learning how to make optimal decisions using scientific methods can greatly benefit them in both personal and professional life. The primary objective of this course is to equip students with tools to optimize decisions in different real-life scenarios: when resources are limited, when decisions must be made sequentially at different times with unknown future conditions, when other people also make decisions and affect the outcomes, when outcomes are heavily affected by human behaviors, and when one has to learn intuitions from data and assist one's decision making. Other objectives are to train students an ability to recognize real-life problems and formulate them into analytical problems, to understand the tradeoffs in different optimization problems and use the qualitative insights for decisions, and to understand the human behavioral impact in decision making and develop strategies to manage such impact.

Grading Scheme

- ◆ Assignment: 20%
- ◆ Midterm Exam 1: 40%
- ◆ Midterm Exam 2: 40%
- ◆ Bonus points: 2% for class participation

Policies

- ◆ Late submission will have 20% penalty for each day past the deadline. And it will not be accepted after two days past the deadline.
- ◆ The best 3 grades out of 4 assignments will be used for the final assignment grade.
- ◆ Students are expected to join class discussion. Students will receive bonus points based on their class performance.
- ◆ The details about the exams will be announced later subject to the university arrangement.

Learning Resources

Useful reference books:

1. Introduction to Operations Research, Hillier and Lieberman, McGraw Hill
2. Matching Supply with Demand, Cachon and Terwiesch, McGraw Hill

Lecture notes are available online <https://canvas.ust.hk/>.

Academic Honesty

As a member of the HKUST community, you are expected to meet the highest standards of academic behavior. Please review the university academic integrity site at <http://www.ust.hk/vpao/integrity/>. If any violation of academic standards is found, related university policies will be strictly enforced.

Course Schedule

Week 1	Introduction to Optimization
Week 2	Making Decisions with Limited Resources
Week 3	Probability Basics
Week 4	Sequential Decision making
Week 5	Making Decisions with Other Players: Game Theory I
Week 6	Making Decisions with Other Players: Game Theory II
Week 7	Midterm Exam 1
Week 8	How to Optimize Waiting Lines for Service Firms?
Week 9	How to Schedule Tasks to Save Time and Resources?
Week 10	How to Use Data to Assist One's Decisions?
Week 11	How to Choose the Best Project Based on Income and Cost?
Week 12	Midterm Exam 2
Week 13	Discussion on Human Behaviors in Decision Making