

Hong Kong University of Science and Technology

School of Engineering

Optimization for Decision Making in Engineering and Business (IEDA 1250)

Spring semester, 2025

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Instructor

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Class Schedule

Tuesday 12:00 pm – 13:20 am, L1 2306

Thursday 12:00 pm – 13:20 am, L1 2306

Course Description

Optimization plays a central role in enhancing decision making – be it in traditional engineering and business settings or in today’s more competitive and dynamic world powered by advanced machine learning techniques. Effective decision making requires sophisticated modeling and solution skills to improve performance metrics such as profit, accuracy, speed, etc. This course provides students with a glimpse of fundamental optimization techniques and their applications in areas such as inventory control, vehicle routing, financial trading, and machine learning, while preparing students for more advanced coursework in the future.

Textbook

1. *Introduction to Operations Research*, by Hillier, Frederick S., and Gerald J. Lieberman, McGraw-Hill, 2015.
2. *Operations and Supply Chain Management*, by F. R. Jacobs and R. Chase (13th edition, McGraw-Hill, 2018)
3. *Convex Optimization*, by Boyd, Stephen, 2004

The textbooks are **optional** but recommended for students with particular interests in Industrial Engineering and Operations Research. They provide broad overviews of the field and materials for solution approaches and various applications.

Course Web Page

A web page will be available for this course on Canvas. You will need to access this web page for announcements about class, lecture notes, homework assignments and their solutions, and other materials. All the slides used in class will be posted on the web page **before** each lecture.

Grading/Evaluation:

Your final grade will be determined using the following weights:

Two Individual Assignments	20%
Midterm Exam	40%
Final Exam	40%
Class Participation	0%, helpful to the boarder case

Assignments

There will be two homework assignments. Students need to work individually on the homework assignments. You should upload a soft copy via Canvas by the date when the assignment is due. **Late submissions will not be accepted.**

Exams

The midterm and final exams will take place during class. They are 90 mins exam. The time and location for the exams will be determined later.

Class Participation

Please come to the class fully prepared. Please carefully review the previous classes, read the assigned materials, be ready and willing to actively engage in the classroom learning experience. This will ensure that you maximize your gain from the class. **Regular attendance and participation in all classes will be helpful for the boundary case**

Prerequisite

- Calculus and Probability at the introductory level will be helpful, but **NOT** required.

Policies

As a member of the HKUST community, you are expected to meet the highest standards of academic behavior. Please review the [university statement on academic integrity](#).

On homework assignments, high-level collaboration, like discussion on methods to solve homework problems, is permitted. However, sharing solutions or numerical answers is not allowed and is considered cheating. **Sharing solutions or cheating on exams will result in a zero grade on that assignment or exam, and related university policies will be strictly enforced.**

Course Schedule (Tentative)

Week 1	Introduction
Week 2	Deterministic decision making: Introduction to linear programming
Week 3	Deterministic decision making: Introduction to integer programming
Week 4	Probability basics
Week 5	Making decisions with other players: Introduction to game theory
Week 6	Midterm exam
Week 7	Sequential decision making: Introduction to dynamic programming
Week 8	Decision making in Investment
Week 9	Decision making in service oriented processes: Introduction to queuing theory
Week 10	Decision making in service oriented processes: Introduction to scheduling
Week 11	Other applications
Week 12	Final exam