The Hong Kong University of Science and Technology

UG Course Syllabus

Fall 2025

Introduction of Industrial Engineering and Decision Analytics

IEDA2010

3 Credits

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Course Description

In today's competitive world, how well a company manages its resources to provide goods or service plays a critical role in the company's success. To manage the critical performance dimensions of companies—cost, quality, speed, and flexibility, and to identify key trade-offs, it is essential for industrial engineers and managers to understand the physical and information processes that are essential in producing and delivering goods and services to customers. This course is designed to develop both tactical skills and high-level insights needed by every industrial engineer and general manager. It consists of two parts. The first part introduces basic industrial engineering analytical tools, such as optimization and probability. The second part introduces the practical concepts of industrial engineering, such as project management, inventory management, revenue management, and forecasting.

Intended Learning Outcomes (ILOs)

By the end of **this co**urse, students should be able to:

1. Master the fundamental theories of industrial engineering analytical tools.

2. Understand the basic concepts and principles of industrial engineering and decision analytics.

3. Apply mathematics and engineering knowledge to formulate and optimize problems in industrial engineering and decision analytics.

4. Evaluate and improve the performance of operations management systems

5. Understand the impact of engineering solutions on a broad range of issues.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Schedule*
Homework assignments	10%	Week 2, 4, 10, 13
In-class activities	5%	Week 11
Mid-Term	35%	22 Oct. 2025
Final examination	50%	University Exam Week

*Please check the updated due dates of homework assignment submissions on canvas

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Homework Assignments	ILO1, ILO3, ILO4	Homework assignments assess the students' ability to master the basic theories (ILO1), apply the theories to formulate and optimize IEDA problems (ILO3), and critically evaluate the performance of operations management systems (ILO4).
In-class activities	ILO2, ILO3	This task enriches students' knowledge of principles and approaches in IEDA to apply in solving practical problems. (ILO2, ILO3)
Midterm Exam	ILO1, ILO2, ILO3, ILO4, ILO5	The midterm exam assesses students ability in mastering the basic theories, principles in IEDA (ILO1, ILO2), and applying on solving IEDA related problems, and make systems performance improvement (ILO3, ILO4), and further analyze the impact of engineering solutions in various scenarios (ILO5).
Final Exam	ILO1, ILO2, ILO3, ILO4, ILO5	The final exam assesses students ability in mastering the basic theories, principles in IEDA (ILO1, ILO2), and applying on solving IEDA related problems, and make systems performance improvement (ILO3, ILO4), and further analyze the impact of engineering solutions in various scenarios (ILO5).

Course Outline

	Topic
1	Introduction
2	Optimization
3	Probability Basics
4	Project Management
5	Location Analysis
6	Inventory Management
7	Supply Chain Management
8	Forecasting
9	Revenue Management

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a strong grasp of concepts, theories and principles of IEDA taught in class. Exhibits excellent capability and creativity in analyzing and solving IEDA related problems, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge of concepts, theories and principles of IEDA taught in class. Exhibits capability in analyzing and solving IEDA related problems, and displays high motivation to learn.
C	Satisfactory Performance	Possesses adequate knowledge of concepts, theories and principles of IEDA taught in class. Makes acceptable progress in applying knowledge on solving IEDA problems. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of concepts, theories and principles of IEDA taught in class. Has potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the concepts, theories and principles of IEDA. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

All students are encouraged to use AI wisely in class activities and discussions with proper acknowledgement.

Communication and Feedback

Students who have further questions about the feedback including marks should consult the instructor/TAs within one week after the feedback is received.

Resubmission Policy

To ensure fairness for students who submit assignments on time, a penalty for late submission is listed as follows:

- Late submission within 12 hours, 25% penalty will be applied.
- Late submission between 12 to 24 hours, 50% penalty will be applied.
- Late submission for more than 24 hours will not be accepted.

Reference Books

- Introduction to Operations Research, Hillier and Lieberman, McGraw Hill

- Matching Supply with Demand, Cachon and Terwiesch, McGraw Hill

- Operations Management, William J. Stevenson and Sum Chee Chuong, McGraw Hill Education (Asia).

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.