

The Hong Kong University of Science and Technology
Department of Industrial Engineering & Decision Analytics

Course Title: Dynamic Pricing and Revenue Optimization

Course Code: IEDA 4420

No. of Credits: 3 credits

Pre-requisites: IEDA 3010 AND IEDA 3250

Instructor: Prof. Qian Liu
Office # 5593
Phone: 23587118
Email: qianliu@ust.hk

Office Hours: by appointment

Teaching Assistants: Shenyu Liu
Office hours: by appointment

Course Description

Revenue management focuses on how firms make price and product availability decisions across various selling channels over time to maximize revenue. Originated from the airline industry, revenue management has proven successful in multiple sectors, including hospitality, manufacturing, retail, media and finance. This course emphasizes the tactical optimization of pricing and capacity allocation decisions for firms selling perishable goods or products in limited supply, especially under changing and uncertain market conditions. The course cover key methodologies used in different industries and explore pricing strategies and practices across sectors. Students will be introduced to quantitative models of consumer behavior and market share, as well as various forms of dynamic pricing and constrained capacity allocation tools. By the end of the course, students should be able to identify and exploit opportunities for revenue optimization in diverse business contexts, applying quantitative analysis to address pricing and capacity allocation challenges in revenue management systems.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Understand the basic concepts and principles in dynamic pricing and revenue management.
2. Understand different pricing and capacity allocation decisions in revenue management practices.
3. Identity opportunities for revenue optimization of firms from various industries.

4. Apply qualitative frameworks and quantitative models to a firm's revenue optimization problem.
5. Improve the ability to use knowledge to solve practical problem skills.

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 (%)	Due date
Homework	20%	Specified in each assignment
Case Study		
Midterm Exam	40%	Oct. 23 in class
Group Project	40%	Last week of Class

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Homework	ILO1, ILO2, ILO4	Homework is designed to assess students' understanding of the key concepts and models in revenue management (ILO1, ILO2), and their ability to develop the quantitative models to solve revenue management problems (ILO4).
Midterm Exam	ILO1, ILO2, ILO4	The midterm exam assesses students' understanding of key principles in pricing and revenue management (ILO1), their ability to develop appropriate models (ILO4), and their skills in analyzing pricing and revenue optimization strategies (ILO2).
Final Exam	ILO1, ILO2, ILO4	The final exam evaluates students' mastery of concepts and principles, as well as their ability to apply them to decision-making problems (ILO1, ILO2). Additionally, it assesses their skills in creating models, deriving solutions, and generating insights (ILO4).
Case Study	ILO1, ILO2, ILO3, ILO4, ILO5	The case study evaluates students' ability to identify opportunities in real-world revenue management challenges (ILO3) and apply the concepts and models of revenue management to practical problems (ILO1, ILO2, ILO4, ILO5).
Group Project	ILO3, ILO4, ILO5	Group projects provide students with the opportunity to work together and apply their

		learning to tailored projects. This involves identifying problems (ILO3), creating quantitative models (ILO4), generating solutions, and offering recommendations (ILO5).
--	--	---

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	• Demonstrate a strong mastery of concepts and principles in revenue management. • Master advanced pricing and capacity control models to address complex revenue management problems. • Actively participate in case discussions and generates insightful contributions. • Collaborate effectively on group projects, producing high-quality presentations and reports. • Consistently delivers work that reflects thorough analysis and deep insights.
B	Good Performance	• Demonstrate a solid understanding of key concepts and principles in revenue management. • Effectively apply revenue management techniques to moderately complex problems. • Actively participate in case discussions. • Collaborate effectively on group projects, delivering good presentations and reports.
C	Satisfactory Performance	• Demonstrate a fundamental understanding of key concepts and principles in revenue management. • Capable of solving standard problems, but may find more complex scenarios challenging. • Participate in case discussions, although engagement may not always be thorough. • Complete group projects with some extra support.
D	Marginal Pass	• Exhibit a minimal understanding of key concepts and principles in revenue management. • Struggle to apply problem-solving skills effectively, often providing incomplete or incorrect solutions. • Participate infrequently in case studies. • Limited collaboration with group members on projects, resulting in poor performance in presentations and reports.

F	Fail	• Fail to demonstrate an understanding of key concepts and principles in revenue management. • Struggle considerably with problem-solving tasks and fail to fulfill basic assignment requirements. • Exhibit minimal to no participation in case discussions. • Show minimal to no involvement in projects, resulting in poor presentations and reports. • Lack effort to engage with the course material or enhance understanding.
---	------	---

Course AI Policy

There are no restrictions on use of generative AI for an assessment task in this course.

Communication and Feedback

Announcements will be made regularly via Canvas and / or via email. Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Reference Book

Robert L. Phillips, *Pricing and Revenue Optimization*, Stanford Business Books, 2015.

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.