Quantitative Pricing Analytics / Electives / 2025

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FACULTY INFORMATION

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FACULTY BIO

Dr. Yeqing Zhou is an Assistant Professor of Operations Management at Rotterdam School of Management, Erasmus University. Yeqing teaches various Operations Management and Revenue Management courses at the Bachelor, Master, MBA and Doctoral level. Yeqing received her Ph.D. and M.S. degree in Operations Research from Columbia University. Her research expertise is in quantitative models in Revenue Management, Supply Chain Management, and Service Operations. Her work addresses operational challenges emerging from innovative selling strategies in the rapidly evolving e-commerce and online platforms.

ABSTRACT

Pricing is one of the most powerful levers a company can use to affect profits. Pricing and Revenue Management is about "selling the right product to the right customers at the right time for the right price". This course will go through a set of practices and tools that firms in various industries use to quantitatively determine the pricing and promotion strategies.

EDUCATIONAL GOALS

This course provides an introduction to both the theory and the practice of revenue management and pricing. Fundamentally, revenue management is an applied discipline; its value derives from the business results it achieves. At the same time, it has strong elements of applied science and the technical elements of the subject deserve rigorous treatment.

Building on a combination of lectures and case studies, the course develops a set of methodologies that students could use to identify and develop opportunities for revenue analytics in different business contexts including the transportation and hospitality industries, retail, media and entertainment, financial services, health care and manufacturing, among others. The course places particular emphasis on discussing quantitative data-driven models and their implementations.

Learning areas	**Educational Goals:** Upon completing of the course, participants should be able to …
I. Content- related	… explain key concepts behind price and revenue analytics, including the interaction between supply and demand, opportunity costs, customer response, demand uncertainty and market segmentation.
	… identify opportunities for dynamic pricing and revenue management and diagnose profitable applicability for a specific business or industry.
	… assess the critical differences among different types of RM opportunities and apply appropriate RM approaches needed to exploit them.

II. Skills-related	… apply tools and frameworks necessary for implementing RM principles and providing tactical decision support in various industries.
	… develop basic data-driven RM models and implement them using desktop tools such as Microsoft Excel.
III. Attitude-related	… communicate the results of your pricing analysis effectively to (internal) stakeholders.
	… understand the value as well as limits and potential issues of an analytical pricing process.

TEACHING METHODS AND WORKLOAD

The course consists of a combination of lectures, in-class discussions, simulation games, and group assignments.

Lectures will be discussion based. Thus, students are expected to contribute and play an active role in their own learning. Students are expected to read the cases and prepare the discussions before the lecture. To acknowledge the importance of pre-class preparation, class participation will contribute to 10% of the final grade.

The course content is practice-based, using state-of-the-art support software to facilitate learning. For all sessions, please bring your own laptop with the relevant files and software installed. The relevant software used in the lectures and assignments are Microsoft Excel with add-ins Data Analysis and Solver. Although you are not required to be an expert on spreadsheet modelling, familiarity with Excel and Solver is a pre-requisite for this course, and it may be a good idea to brush up your Excel skills before the course starts.

Some lectures will involve in-class simulation games to illustrate key concepts in pricing and revenue management. Further details regarding the games will be provided as the course progresses.

Description	Calculation	Total
In-Class sessions:	6 x 3 hours	18 hours
Class Preparation:	6 x 5 hours	30 hours
Individual Assignment	18 hours	18 hours
Group Assignment	18 hours	18 hours
Total Course Hours		84 total hours
EC (Number of study credits)	3 EC x 28	84 total hours

GRADING AND ASSESSMENT

Class participation will be assessed for each session, although **the final participation grade will be based on the five best participation grades** across the six sessions. The central focus will always be on the quality of your class contribution as opposed to the quantity. This focus on quality ensures that all students benefit from the classroom experience, and all have an opportunity to contribute. High-quality contributions are meaningful, thoughtful, relevant remarks or questions that enhance everyone's understanding of the case or concepts discussed and do not have to be "correct". Arriving late in class or not being present will reduce the participation grade.
There are two assignments which are equally weighted. The first assignment is an individual assignment, and the second one needs to be done in groups, with each group handing-in one report per assignment. There are no restrictions on group composition, although the group size cannot exceed four participants. The assignments will

be made available on Canvas and all assignments must be handed in before the due date and time, via Canvas to the MBA Program Office.

Course: Pricing and Revenue Management	Assessment Formats			
Educational goals per course:	**Participation**	**Individual Assignment**	**Group Assignment**	**Total**
After following this course, students will be able to:				
• Explain key concepts behind price and revenue management	x	x	x	15%
• Identify opportunities for (dynamic) pricing strategies and revenue management	x	x	x	10%
• Assess the critical differences among different type of RM opportunities	x	x	x	20%
• Apply tools and frameworks necessary for implementing RM principles		x	x	20%
• Develop basic data-driven RM models and implement them using desktop tools such as Microsoft Excel		x	x	20%
• Communicate results of your pricing analysis effectively to stakeholders	x		x	10%
• Understand the value as well as limits and potential issues of an analytical pricing process	x			5%
Weighting factor	0 %	50%	50%	100%
Minimum grade required	PASS/FAIL	5.5	5.5	5.5
When failed, resit option within the current academic year (Yes/No)	No	Yes	Yes	
Form of examination (e.g. MC, Open-book, etc.)	Participation	Individual report, open-book	Group report, open-book	
Group / Individual assessment (Group/Individual)	Individual	Individual	Group	

In order to pass the course, each assessment or deliverable (component grade) with a resit option, needs to be at least 5.5. Components with no resit option bear no minimum grade required, but to pass the overall course, the final grade needs to be at least 5.5.

Grades are rounded according to the rounding provisions included in the Examination Regulations (ER) of the programme, and are expressed with 1 decimal point. Not meeting the minimum grade required for either a component grade or the overall course grade determines a fail for the course. Participants can resit a failed component only once. There is no capping of the grade for a resit examination, unless determined by the faculty. The only exception is when the nature of the failed assignment allows for an improvement effort of the same assignment (capped at 5.5 for that component). For this particular course, the faculty has decided that all assignments allow for *an improvement effort.*

Grade penalties for unauthorized late submissions will be automatically imposed. Penalties for unauthorised late submissions range from 10% to 20% deduction from the examination component depending on the hours/days

late. Unauthorised late submissions 4 days or longer after the deadline without prior notification and a reasonable explanation for the late submission, will not be accepted.

Attendance is mandatory and a requirement to pass the course. Missing classes and arriving late may result in grading penalties and even a fail for the course.

Fraud, Plagiarism / Self-plagiarism (Appendix B on Code of Conduct, Examination Regulations -ER-)
The Examination Board defines fraud as "*the action or negligence of a student because of which it is impossible, entirely, or partially, to form a correct judgment about the knowledge, insight, and skills of them or another student*" (ER, 2024-2025). Examples of fraud are cheating, cribbing, plagiarism, freeriding in a team assignment, availability of unauthorized (study) material during a test such as mobile phones, contract cheating/outsourcing/ghost-writing, unauthorized use of generative AI, identity fraud, theft.

Confirmed cases of fraud/plagiarism will lead to (appropriate and proportional) sanctions as defined by the Examination Board in the Rules and Guidelines section of the Examination Regulations (ER). Repetitive cases of fraud/plagiarism lead to expulsion from the programme.

Plagiarism is presenting another person's work as one's own. Plagiarism includes any paraphrasing or summarising of the work of another person or group without acknowledgment, including submission of another student's work as one's own. Plagiarism frequently involves a failure to acknowledge the quotation of paragraphs, sentences, or even a few phrases written or spoken by someone else.

Using ideas from your own prior work (assignment) without referencing the work in your assignment is considered self-plagiarism.

Participants are required to adhere to the 6 principles outlined in the RSM AI guidelines with regard to the use of Artificial Intelligence Platforms such as ChatGPT and related software/tools. The unauthorised use constitutes violation of plagiarism/ fraud policy. For this particular course, the faculty promotes an "*embraced*" use of AI.

For more information about academic integrity and AI please refer to the Programme's Examination Regulations and RSM AI guidelines documents on the Student Hub.

Assessment / Deliverable:	Individual or group:	(Due) date and hand in location:	% of final grade:
In-class participation	Individual	N/A	0 %
Individual Assignment	Individual	TBD	50 %
Group Assignment	Group	TBD	50%

For all Canvas submissions, please make sure to include the student name and programme name in the title of the file submission, as well as within the document itself (on the cover page).

REQUIRED TEXTBOOK(S) AND READINGS

Highly Recommended: *Pricing and Revenue Optimization* by Robert L. Phillips. Second Edition. Stanford Business Book. The syllabus includes specific references to various chapters in this book, listed as **PRO**.

Additional Reading: *The Theory and Practice of Revenue Management* by Talluri, Kalyan and van Ryzin, Garrett.

Kluwer Academic. This book provides a deeper and more mathematical treatment of the concepts of Pricing and Revenue Management.

The course material consists of cases, relevant articles and notes that will be distributed online via Canvas. Additional materials, including the lecture presentations, will also be distributed online, or in-class as hard copies.

DETAILED COURSE SCHEDULE

Session 1: Introduction to Pricing and Revenue Management	
Topics:	• Introduction and structure of the course • History of Pricing and Revenue Management • Key drivers for successful pricing and revenue management strategies. Applications in various industries • Basic concepts of price optimization
In class exercises:	• Customer Valuation Game
Readings:	• Suggested: Chapter 1-2 in PRO
Case:	N/A

Session 2: Price Optimization and Differentiation	
Topics:	• Price-Response Curves • Market segmentation and price differentiation
In class exercises:	N/A
Readings:	• How Do You Know When the Price Is Right? R.J. Dolan, Harvard Business Review • Suggested: Chapter 3-7 in PRO
Case:	• What prices Vertigo?

Session 3: Quantitative Models of Consumer Demand and Estimation	
Topics:	• Discrete choice models; the MNL model • How to fit a choice model from data • Estimation techniques
In class exercises:	N/A
Readings:	• Suggested: Chapter 3-7 in PRO
Case:	• Personal training at the NY Health Club

Session 4: Retail Markdown	
Topics:	• Markdown pricing optimization • Application in fashion retail • Play and debrief the retailer game
In class exercises:	• Retailer Game
Readings:	• Suggested: Chapter 12 in PRO
Case:	• Bloomingdale case part A • Bloomingdale case part B • Retailer: A Retail Pricing Simulation Exercise

Session 5: Revenue Management with limited capacity and uncertainty	
Topics:	• Revenue Management of a single resource • Fare classes • Overbooking • Stochastic Inventory Management and the Newsvendor Model
In class exercises:	N/A
Readings:	• Introduction to the Theory and Practice of Yield Management (Netessine & Shumsky), prepare to discuss the questions in Appendix B. • Suggested: Chapter 8, 9, and 11 in PRO
Case:	N/A

Session 6: Latest development in pricing analytics	
Topics:	• Pricing in emerging markets • Dynamic Pricing/ Surge pricing • Personalized Pricing/ Customized Pricing • Fairness issue in pricing and revenue management
In class exercises:	N/A
Readings:	• 'What Price Fairness?' by Paul Krugman, New York Times, 2000. • Uber Surge Pricing • Suggested: Chapter 13-14 in PRO
Case:	N/A

ASSIGNMENTS DESCRIPTION

Assignment 1 - Individual Assignment

In this assignment, you will work on a data set generated from the in-class exercise and develop further analysis according to the questions.

Content

The assignment contains multiple quantitative questions. You are expected to clearly state the assumptions and models that are suitable for the analysis.

Estimated Time

18 hours. 30% reading and research; 40% quantitative analysis; 30% formalization.

Deadlines

The assignment will be posted after Session 5 and due on Friday Oct 24th, 2025, at 23:59.

Assignment 2 – Group Assignment

3-4 students will form a group and work together in two group assignments. The assignment includes both quantitative analysis and qualitative analysis and reflection on the revenue management problems in the case study.

Estimated Time

18 hours. 20% reading and research; 60% quantitative analysis; 20% formalization.

Content

The assignment will be multiple questions related to a case study. You and your group members should first write a short summary documenting the content of the case and identifying the assumptions and model that is suitable for the analysis.

Deadlines

The group needs to submit one report per group via Canvas submission. The assignment will be posted after Session 2 and due on Friday October 17th, 2025 at 23:59.

Communication

The formation of the group should be finalized before Session 2. Each group shall elect a coordinator who will communicate between the team and the lecturer. The coordinator will be responsible for submitting the group report via Canvas.

Grading Rubric for both Assignments

	Does not meet expectations 0-5.49	Sufficient but needs improvement 5.50-6.99	Meets expectations 7.00-8.49	Exemplary 8.50-10
Short summary of the case and the assumptions (20%)	The description is vague and inaccurate.	The summary is clear with minor mistakes.	The summary is correct and well structured.	The summary is precise and well-written. The description of the assumptions and model choices are well-justified.
Each sub question (weight specified in the assignment)	The theoretical idea is not relevant to the subject of the course.	The model and analysis are relevant to the subject of the course; the presentation of the analysis is direct without storytelling.	The model and analysis are correct; the presentation of the analysis is well-structured and easy to follow.	The model and analysis are rigorous with good justifications and reflections.