

MANAGEMENT SCIENCE AND ENGINEERING
DROM B8123.060 DEMAND ANALYTICS
Thursdays 9 :00am – 12:00 pm EST (Full Term)

Fall Semester 2023

Professor Awi Federgruen

How do airlines decide when to increase ticket prices? Should a hotel charge less per night for a long stay than a short one? Why do some software companies bundle very different products together? How should a fashion retailer decide when to start discounting clothes? Why do so many discounted rates end in “.99”? How should companies estimate future demand for their products?

These are only a small sample of the operational and pricing challenges all businesses regularly face. These challenges are often addressed individually and in isolation but, in reality, all of these decisions interact with each other. This class looks at the demand management challenges faced by companies in various industries and provides an introduction to the tools that can be used to address these challenges. Specific topics covered include (subject to change)

- Basics of price optimization
- Static and dynamic price optimization
- Market segmentation
- Customized pricing
- Non-linear pricing
- Markdown pricing
- Overbooking strategies
- Consumer choice modeling

Prerequisites An understanding of both probabilistic and deterministic modeling.

Course Texts There are no required books for the class. All material will be provided in class slides. Some of the material in the class is based on the following texts:

- R.L. Phillips. *Pricing and Revenue Optimization*. Stanford University Press, 2005.
- Ozer, O. and Phillips, R. *Oxford Handbook of Pricing Engineering*. Oxford University Press, 2012.
- Revenue Management and Pricing Analytics, Springer, 2019

The following book may also be useful for referenced purposes:

- K.T. Talluri and G.J. van Ryzin. *The Theory and Practice of Revenue Management*. Springer, 2004.

Delivery methods:

Classes will be based on lectures and discussion as well as an educational game.

In addition there will be group lunches to discuss career plans

Teacher	Professor Awi Federgruen af7@gsb.columbia.edu	TA	Yuri Fonseca YFonseca23@gsb.columbia.edu
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Office Hours See Canvas/Courseworks. And by email appointment

Homework There will be four homework assignments. You may work with other classmates on these assignments, but each student must turn in an individual solution. Keep in mind that you will not be allowed to collaborate on the exam questions. Please check Canvas/Courseworks for due dates.

Exams There will be a final in-class exam on December 14

Grading I will calculate a grade for each student as follows:

Final exam	50%
Homeworks	25%
Game	10%

Participation 15%

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CLASS SCHEDULE (SUBJECT TO CHANGE)

Class	Date	Topics and Assignments
1	Thursday Sept 7	Introduction & Pricing Fundamentals
2	Thursday Sept 14	Static Price Optimization
3	Thursday Sept 21	Dynamic Price Optimization
4	Thursday Sept 28	Price Differentiation
5	Thursday Oct 5	No class
6	Thursday Oct 12	Quantity-Based Revenue Management
7	Thursday Oct 19	Revenue Management Game
8	Thursday Oct 26	Network Revenue Management & Overbooking
9	Thursday Nov 2	Consumer Choice Models
10	Thursday Nov 9	Price Competition Models
11	Thursday Nov 16	Markdowns 1
12	Thursday Nov 30	Markdowns 2 Pricing Competition
13	Thursday Dec 7	Conjoint Analysis