Description. The field of Revenue Management (RM) deals with selling a product at the right price, at the right time to the right person. Many industries use revenue management tools to maximize the return on their limited supply of products. Airlines use revenue management to decide what fare classes should remain open and what fare classes should be closed. Hotels use revenue management to choose the room rates and to decide how much to overbook. Revenue management is increasingly important in retail, telecommunications, entertainment, financial services, health care, manufacturing, as well as on-line advertising, online retailing, and online markets. In parallel, pricing and revenue optimization has become a rapidly expanding practice in consulting services, and a growing area of software and IT development. The goals of the course are the following.

1. Introduce the state-of-the art in the theory and practice of revenue management in the context of different applications.

2. Learn about quantitative models that capture consumer behavior and market uncertainty that are key ingredients for revenue management problems

3. Help each student develop his or her own intuition about the advantages and limitations of the models and how these approaches can be adapted in a particular real-world problem.

Prerequisites. Probability and Statistics (IEOR E4150), Optimization Models and Methods (IEOR E4004).

Recommended Texts


Organization and Grading

Homeworks. Homeworks must be individual work and submitted at the start of the session it is due. Students may discuss homework exercises with others but no person should rely on a written solution of a homework exercise, even if one is available.

Midterm and Final. The course will have a midterm and a final exam. Midterm will be held in class on Feb 23rd. The date for the Final will be determined by the Registrar.

The grade will be assigned using the following weights.

1. Homeworks: 25%
2. Midterm: 30%
3. Final: 40%
Tentative list of topics

1. Basic pricing theory with deterministic demand
2. Newsvendor problem and Littlewood formula
3. Capacity Control: Booking Limits
4. Logit Demand Model and Logistic Regression
5. Consumer Choice Models
   (a) Multinomial logit model: MLE and Assortment Optimization
   (b) Mixture of logit model: Estimation using EM algorithm
   (c) Markov Chain model
6. Dynamic pricing in stationary environments
   (a) static pricing heuristic
   (b) resolving heuristic
7. Network Revenue Management
   (a) Bid pricing
   (b) Applications: online advertising, online resource allocation
8. Online Problems
   (a) Threshold policies
   (b) Examples: classical secretary problem, Prophet inequalities
9. Exploration and Exploitation tradeoffs: classical Multi-armed bandit problem