

# IL 6451 Demand and Revenue Management

## Syllabus

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### Description:

An overview of demand estimation and revenue management, also called pricing and revenue optimization, including

- statistical techniques for estimating and forecasting the level and characteristics of demand;
- revenue-based inventory control methods;
- static and dynamic pricing decisions;
- auctions;
- optimization approaches to revenue management, both exact and approximate.

### Objectives:

The objectives are to

- develop an understanding of the benefits and costs of systematic quantitative revenue management, and the process by which such revenue management can be implemented;
- develop a familiarity with demand modeling, forecasting, and revenue management techniques;
- understand the strengths and weaknesses of the available statistical tools for demand forecasting;
- develop insight into the formulation and solution of pricing and revenue optimization problems.

### Prerequisites:

A basic knowledge of probability and statistics. Students should also know how to use the statistical and optimization tools in a spreadsheet.

**Textbook:**

Cross, Robert G., *Revenue Management*, Broadway Books, New York, 1997. (The book is mailed to course participants).

**Other Readings:**

1. Air Transport Association, *Airline Handbook*, Chapter 4,  
<<http://www.airlines.org/public/publications/display1.asp?nid=964>>.
2. Bell, P. C., "Revenue Management: That's the Ticket", *OR/MS Today*, volume 25, number 2, p. 28, April 1998.
3. Boyd, E. A. and Abbott, K., "Case Studies in Contract Management: Improved Revenues Through Stratified Rate Structures", PROS R&D Report CS-H11, June 2000.
4. Carroll, W. J. and Grimes, R. C., "Evolutionary Change in Product Management: Experiences in the Car Rental Industry", *Interfaces*, volume 25, number 5, pp. 84–104, September-October 1995,  
<<http://www.interfaces.smeal.psu.edu/>>,  
<<http://www.interfaces.smeal.psu.edu/pdf/v25n5a5.pdf>>
5. Justin A. Colledge, Jason Hicks, James B. Robb, and Dilip Wagle, "Power by the Minute", *The McKinsey Quarterly*, 2002, Number 1,  
<[http://www.mckinseyquarterly.com/article\\_page.asp?tk=268249:1142:8&ar=1142&L2=8&L3=48](http://www.mckinseyquarterly.com/article_page.asp?tk=268249:1142:8&ar=1142&L2=8&L3=48)>
6. Cook, T. M., "SABRE Soars", *OR/MS Today*, volume 25, number 3, pp. 26–31, June 1998, <<http://lionhrtpub.com/ORMS.shtml>>
7. Andreas Florissen, Boris Maurer, Bernhard Schmidt, and Thomas Vahlenkamp, "The Race to the Bottom", *The McKinsey Quarterly*, 2001, Number 3,  
<[http://www.mckinseyquarterly.com/article\\_page.asp?tk=268249:1078:21&ar=1078&L2=21&L3=37](http://www.mckinseyquarterly.com/article_page.asp?tk=268249:1078:21&ar=1078&L2=21&L3=37)>
8. Robert A. Garda and Michael V. Marn, "Price Wars", *The McKinsey Quarterly*, 1993, number 3, pp. 87-100,  
<[http://www.mckinseyquarterly.com/article\\_page.asp?tk=268249:23:16&ar=23&L2=16&L3=19](http://www.mckinseyquarterly.com/article_page.asp?tk=268249:23:16&ar=23&L2=16&L3=19)>.
9. Geraghty, M. K. and Johnson, E., "Revenue Management Saves National Car Rental", *Interfaces*, volume 27, number 1, pp. 107–127, January-February 1997,  
<<http://www.interfaces.smeal.psu.edu/>>,  
<<http://www.interfaces.smeal.psu.edu/pdf/v27n1a6.pdf>>
10. Gray, D. A., "Under Fire: Lessons From the Front", *OR/MS Today*, volume 21, number 5, pp. 18–23, October 1994.
11. Horner, P., "The Sabre Story", *OR/MS Today*, volume 27, number 3, pp. 46–47, June 2000, <http://lionhrtpub.com/ORMS.shtml>

12. Jacobs, T.L., Ratliff, R.M., and Smith, B.C., “Soaring with Synchronized Systems”, *OR/MS Today*, volume 27, number 4, pp. 36–44, August 2000, <<http://lionhrtpub.com/orms/ORMS-archive.html>>.
13. Lodish, L. M., “Applied Dynamic Pricing and Production Models with Specific Application to Broadcast Spot Pricing”, *Journal of Marketing Research*, volume 17, pp. 203–211, 1980.
14. McKinley, J., “For the Asking, a \$480 Seat”, *The New York Times*, Friday, October 26, 2001.
15. Pogrebin, R. and McKinley, J., “Mixed Notices For the \$480 Ticket”, *The New York Times*, Saturday, October 27, 2001.
16. Secomandi, N., Abbott, K., Atan, T., and Boyd, E.A., “From Revenue Management Concepts to Software Systems”, *Interfaces*, volume 32, number 2, pp. 1–11, March/April 2002, <<http://www.interfaces.smeal.psu.edu/>>.
17. Smith, B.C., Günther, D.P., Rao, B.V., and Ratliff, R.M., “E-Commerce and Operations Research in Airline Planning, Marketing, and Distribution”, *Interfaces*, volume 31, number 2, pp. 37–55, 2001, <<http://www.interfaces.smeal.psu.edu/>>.
18. Smith, B.C., Leimkuhler, J.F. and Darrow, R.M., “Yield Management at American Airlines”, *Interfaces*, volume 22, number 1, pp. 8–31, January-February 1992, <<http://www.interfaces.smeal.psu.edu/>>, <<http://www.interfaces.smeal.psu.edu/pdf/v22n1a1.pdf>>.
19. Smith, R., “Revenue Management: Hotels, airlines, opera houses hope this tool will help them maximize sales and profits”, *San Francisco Chronicle*, Tuesday, May 25, 1999, <<http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/1999/05/25/BU88902.DTL>>

### Program:

- September 20, 2003
  - Introduction to Revenue Management
  - The Inventory Pricing Game
  - Demand Modeling and Forecasting
- September 22, 2003
  - The Competitive Inventory Pricing Game
  - American Airlines Case Study
  - Optimization Models
    - \* Availability control methods

- \* Bidprice methods
- \* Dynamic pricing models
- September 24, 2003
  - Auction Methods
  - Case Studies in various applications