Revenue Management and Pricing

Sample Course Syllabus
(subject to minor revisions)

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Office Hours: After class or by appointment.

INTRODUCTION:
Revenue Management and Pricing (RMP) focuses on how firms should manage production capacity, resources and product availability policies across different selling channels in order to maximize performance and profitability. The primary goal of Revenue Management has been succinctly described as “selling the right product to the right customer at the right time for the right price”. RMP offers great value to companies selling seasonal/perishable products under uncertain and changing market conditions.

The philosophy, strategy and techniques are widely used in the following industries:
- Transportation (airline, railway, rental car)
- Hospitality (hotels, cruise lines, ferries, casinos)
- Media (television advertising, internet ad sales)
- Retail (apparel, consumer goods)
- Health Care (hospitals, clinics)
- Manufacturing (made-to-order manufacturing)
- Finance (financial products)

For example, American Airlines estimates that its pricing and revenue management practices have generated more than $1.4 billions in additional incremental revenue over a three-year period. In addition, the restless evolution of information technologies and software development have fueled the rapid growth of commercial RMP systems and related consulting services.

COURSE OBJECTIVES:
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 an applied science and the technical elements of the subject deserve rigorous treatment. The plan of this course is to discuss both these practice and theory elements.

Building on a combination of lectures, case studies the course develops a set of methodologies that students could use to identify and develop opportunities for revenue optimization 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.
PREREQUISITIES:
The prerequisites for the course are some familiarity with basic Operations Management and Statistics subjects such as linear programming, inventory management, regression and time series analysis. Some background in microeconomics is useful as well, but is not essential.

GRADING COMPONENTS
- Individual Assignments 20%
- Group Projects 30%
- Class Participation 20%
- Final Exam 30%

Please read the following descriptions very carefully

Individual Assignments: There are six case assignments to be done individually. Submissions should be up to two pages in length and be submitted at the beginning of the session in which they are due. Keep a copy for your reference during class. Show all the work if your response requires a calculation.

Group Project: There are two data-driven projects to be done in groups of maximum four students. Projects submitted by groups of five or more students will not be accepted for credit. In the same spirit, groups should not collaborate with each other for the purpose of doing the assignments. There is no restriction in the length of this project but precise and short answers are expected. Keep a copy for your reference.

Final Exam: An in-class, open book/notes test during our last meeting.

ATTENDANCE and CLASS PARTICIPATION
Attendance at each class is required. If you cannot attend a particular class, please contact the instructors in advance in order to arrange for appropriate substitution.

The development of speaking and listening skills is considered an important part of your evaluation in this course. Please use the following guidelines to determine your effectiveness in class participation
- Your comments should contribute meaningfully to learning in case discussions and lectures. At the same time, there are no stupid questions.
- Incomplete points or “one-word answers” will not get credit. Well defended and well thought out points will get due credit.
- There may be cold-calling. If you have not been able to prepare a case, or if you are uncomfortable with being called on in a particular class, please let the instructor know in advance of the class.
- There are no alternative assignments in lieu of class participation.

TEXTBOOKS:
- Reference (not required): The Theory and Practice of Revenue Management by K. Talluri and G. Van Ryzin. Kluwer Academic Publishers, 2004. This is a terse book that mostly covers the technical details of the concepts we will cover in class. (TVR-textbook in this syllabus)

COMPUTER SOFTWARE: EXCEL
CLASS SCHEDULE

**Session 1: Introduction**
- Examples and simulations.
- The RM Process
- Classification and introduction to the models, course plan

**Read:**
- Chapter 1 of PRO-textbook
- Chapter 1 in TVR-textbook (handout available in the course website)

**Session 2: The Theories of Pricing**
- Brief review of microeconomic and marketing theories on consumer behavior and pricing.
- Constrained pricing policies.

**Read:**
- Chapters 2 & 3 PRO-textbook.
- Case: Uber

**Session 3: Surge Pricing and E-Commerce Pricing**
- Product design, bundling, demand segmentation, and screening devices.
- Customized pricing and e-commerce.

**Read:**
- Chapter 4 PRO-textbook.
- Cases: Re-Pricing, What Savored Groupon

**Sessions 4: Demand Forecasting and Data Analysis**
- Data, sources, systems, automation.
- Time-series forecasting and perfect demand segmentation models.
- Estimation techniques.
- Unconstraining for unobservable no-purchases--concept and the EM technique

**Session 5: Pricing Policies in Action**
- Markdown policies and liquidations.
- Pricing with supply constraints.

**Read:**
- Chapters 5 and 10 in PRO-textbook
- Chapter 5 in TVR-textbook (handout available in the course website)
Sessions 6 & 7: An Operational Model of RM

- Stochastic Inventory Management and the Newsvendor Model.
- Single resource Revenue Management, expected marginal value to control sales.
- Overbooking

Read:
- Chapters 6 and 7 in PRO-textbook
- A Note on the Newsvendor Model: Inventory Planning for Short Lifecycle Items (available on course website)
- Article “Implementing Restaurant Revenue Management” (available on course website)
- Case: BlueSky

Sessions 8: Network RM

- Network revenue management, control mechanisms
- Linear Programming approach to Revenue Management
- Applying network RM to different industries

Read:
- Chapters 8 and 9 in PRO-textbook
- Introduction to Linear Programming (available on course website)
- Case: TNG (discussed in Session 7, to be handed in Session 8)

Sessions 9: Performance Measurement

- Solving Revenue Management Problems.
- Computational methods in Revenue Management

Read:
- Appendix A in PRO-textbook,
- Case: Bloomingdale

Session 10: Competitive Factors

- Imperfect segmentation model: Discrete choice models
- Customer management and strategic purchasing behavior
- RM Process management (organizational issues)

Read: Chapter 12 in PRO-textbook
Case: Personal Training at the New York Health Care Club.

Session 11: New Directions in Revenue Management

- Business Analytics.
- Applications in new industries: Event sales, casinos, Display advertising.
- Bundling and RM.
- Case: Revenue Management at Harrah’s Entertainment

Session 12: Class Wrap-Up and Final Exam

Final Exam: This is an in-class, open book/notes test. It will include calculations and short answers and responses. The material on the test is based primarily on class lectures and discussions. Calculators allowed but please, no computer.
ADDITIONAL RESOURCES

- IATA RM Conference  http://www.iata.org/Pages/default.aspx
- INFORMS Rev. Mgmt. Section  http://www.informs.org/Community/revenue-mgt
- Center for Pricing and Revenue Management  http://www7.gsb.columbia.edu/cprm/