College of Business Administration

California State University San Marcos

Dynamic Pricing and Revenue Management  BA 690J

Fall 2006

Instructor:    Dr. Robert Aboolian
Office:      Markstein Hall 446
Phone:    (760) 750-4221
Office Hours:    W 12:00 – 13:00, and by appointment
Email:    raboolia@csusm.edu
URL :   www.csusm.edu/aboolian

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Tentative Course Outline:

Disclaimer: While the topics that I will cover and their emphasis will follow the description given below; I reserve the right to make some changes on the syllabus through the course of the semester.

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<th>Topics Covered</th>
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* Students are supposed to bring laptop computers to these sessions. You can borrow them from Library on temporary basis. There are enough laptops on reserve in the Library for the students taking this class.
Course Description:

Revenue management (RM) is the art and science of price-driven profit optimization. The Wall Street Journal has coined RM as the “number-one emerging business strategy”. In today’s dynamic markets, the key challenge is to sell the right product to the right customer, at the right price, at the right channel, and at the right time. RM manages multiple prices to extract the maximum value from demand and supply imbalances.

The proposition value of RM (and this course) is beyond the concept of how pricing decisions are actually made and is changing dramatically with the recent advances in decision and information technology. “The combination of science and technology applied to the age-old demand management is the hallmark of modern RM”.

Pricing can be the one of the most powerful levers a company can use to affect revenues and profits, but unfortunately pricing decisions are made less thoughtfully and systematically than one would expect.

Being initially applied to Airline industries, revenue (or yield) management has reformed the entire transportation and tourism industry, as well as telecommunications, broadcasting, ticketing, healthcare, fashion, manufacturing etc. Recently RM evolved to a new dimension with internet companies practicing dynamic and targeted pricing or auctions for products, services or advertisement slots.

A specialized course on dynamic pricing and revenue management is meant to provide students with the right bundle of tools and principles (drawn from several disciplines such as Operations, Microeconomics, Decision Modeling, Statistics, Marketing, and Information Systems) to maximize profits.

The RM solution integrates pricing with sales and inventory management strategies. The first part of the course addresses pricing issues (pricing under various constraints, non-linear pricing, markdown pricing), from a combined economics and marketing perspective. The second part of the course provides tools and methods for combined pricing and capacity management decisions from an operational perspective.

Course Objectives and Learning Outcomes:

The goal of the course is to teach you the following:

• strategic and analytical tools for implementing dynamic pricing and revenue management principles and providing decision support in various industries;
• qualitative and quantitative methods to evaluate the impact of dynamic pricing and revenue management on a particular business; and
• how to identify opportunities for dynamic pricing and revenue management, and conditions for profitable applicability;
• Current dynamic pricing and revenue management practices in various industries.
Method of Instruction

Students will face real life situations during the entire course and will be requested to develop solutions to current issues. Business case techniques for the adoption of tools for decision support, execution and implementation will be illustrated and used throughout the class.

Course Prerequisite(s):

Senior students are allowed to take this course.

Course Material:

Readings: The course is delivered through a combination of lectures and cases. All the readings and cases are contained in the course pack and the course web site and will be supplemented by class lectures. Required course pack is available at the bookstore.

Course Website: All the lecture, as well as every other useful material and information notes will be posted on the course website--WebCT before each class. Find instructional notes on accessing this website on-line at: http://courses.csusm.edu/resources/students/basicwebct4x.html

Additional RM material (not required, available on reserve in Kellogg Library)

4. Revenue Management and Pricing, Yeoman & McMahon-Beattie (eds), Thomson, 2004
5. Yield Management, Ingold, Yeoman & McMahon (eds) , 2nd edition, August 2001
6. Yield Management: applications to air transport and other service industries, Daudel & Viale, ITA, 1994
7. Nonlinear Pricing, R. Wilson, Oxford University Press, 1992

Student Profile

To serve you better, I need to know more about you. Fill in the student information form provided in WebCT under student profile. Attach your picture to the form and hand it in on August 26, 2006. Provided information will be considered and kept confidential.
Course Policies

1- Academic Honesty

Any evidence of cheating, fabrication, facilitating academic dishonesty or plagiarism will be reported to the Dean of students for appropriate disciplinary action. These offences may result in you being expelled, suspended or put on probation. You will receive a failing grade for the assignment (0%). Please refer to the General Catalog for description of these offences. It is your responsibility to know what each means. This information is also available on-line under Official Notices and Policies at: http://lynx.csucm.edu/policies/policy_online.asp?ID=25

2- Accommodations

Students acquiring reasonable accommodations because of a disability need to contact Disabled Student Services in order to make necessary arrangements.

3- Other Policies

a. Please refrain from unnecessary conversation during class.
b. During class cell phones must be turned off.
c. Please refrain from text messaging during class.
d. Please refrain from emailing or surfing the web using laptop computers during class.
e. All of the assignments and exams must be completed. Otherwise you will not receive a passing grade.

If you disrupt the class, the Dean of Students will be informed of your behavior. I may request that you be administratively withdrawn from the class.

Grading Format:

First thing to remind you is that “I do not give you grades, you earn them”. The grades will be distributed with the following format:

A: 95%-100%,   A-: 90%-94%,   B+: 87%-89%,
B: 83%-86%,    B-: 80%-82%,   C+: 75%-79%,
C: 70%-75%,    D: 60%-69%,    C: 69%-69%,
F: 0%-59%

Course Evaluation:

The course grade is made up of seven components, each weighted as follows:

Assignments: 30%
Final Project: 40%
Participation/Attendance: 15%
Paper/Case Presentation and Discussion 15%
Assignments: (30%)

All assignments (2 cases + one exercise set) are group based. Assignments, together with supporting data files, should be sent to me by email at least one hour before class, with cc to dsirypan@csusm.edu. Electronic files should be named using your “group members’ last names”. Bring copies for your reference during class discussion. Please keep group sizes to at most four. As most of the work is in groups, individual grades will take into account a peer review from each group member of other members in the group. “If any individual has not contributed for a particular week, the student should not append his/her name to the case report but submit a separate report on their own”.

Guidelines for Written Case Analyses:

The reports are graded for both content and presentation. A good paper should clearly and succinctly state the recommendations in the first paragraph to provide the reader with a framework. Recommendations are based on the questions asked within the case. (If a lengthy description of the recommendation seems necessary, append it to the report.) The remaining paragraphs should each present a major part of the rationale for the recommendation in terms of the desirable and undesirable consequences of adopting it. The rationale must consider capabilities that the logistics system under study needs to excel at, and how the current system either provides these capabilities or fails to provide them. Some common problems in preparing reports:

• Presentation related: A good report is NOT a chronology of analysis (i.e., answering the questions listed in sequence), but a clearly articulated statement of recommendation and support. If there are options under consideration in the case that are rejected by you, a clear rationale for your decision should be provided. Facts stated in the case need not be restated unless used to make a point. I will assume that the most important issues are raised in the report and that all else is less important to the writer. Both desirable and undesirable consequences should be factually stated and supported. In the overall evaluation of the report the discussion of all consequences of the recommendation is of the greatest importance.

• Analysis related: Other reports suffer from inadequate analysis. Analysis for a report is a time consuming and intellectually challenging task. Each case has a set of questions which are essentially a guide to help you with the analysis. The objective is to evaluate a complete range of alternatives and discuss the full consequences of your recommendation.

Reports should be typed with 1.5 line-spacing and should not exceed 5 pages, not including appendices and exhibits. Exhibits appended to the reports need not be typed, but should be neat and easy to understand.
Final Project: (40%)

A final group project is one of the requirements for this course. This project will require applying concepts to be taught through course work to a real life situation. Each team will be required to prepare a 10-15 pages project report (both paper and email) and also to present the major findings of their project on final class meetings (25-30 minutes). All the group members are supposed to participate in oral presentation.

Project Deliverables

1. One page project proposal is due on September 23, 2006, which should describe the topic, team, specific goals, and proposed project plan.
2. One page revised proposal is due on October 7, 2006.
3. One page project progress report is due on October 28, 2006.
4. Final Project report is due on December 2, 2006.

Project Guidelines

This is a project that can be done individually or in groups (It would be best to use the same groups that you are using for class assignments. However this is not a requirement). The purpose of the course project is for you to explore how dynamic pricing and revenue management principles and techniques learned in class can be applied to real business. The topic of the project is flexible. I suggest a few strategies, but they are not restrictive:

- **Specific Company.** Choose a local business (e.g. CSUSM gym or Parking Services) where revenue management has potential. Investigate and analyze the level of DPRM practiced, if at all. Propose concrete strategies to develop and enhance these practices in the specific business context. Discuss the implementation process, challenges and potential impact. An ideal (but not required) arrangement is one where the project is hosted by the company, which actively assists the project team, and provides real data. This type of project should be written in case study format.

- **Comparative Study.** Choose a generic, virtual or remote business (e.g. media advertising, cargo, and telecom). Gather information from a few companies in this business, and do a comparative study of the RM practices and opportunities in this sector. Propose innovative strategies and discuss implementation.

- **New Business.** Develop a business plan for a new company that provides or utilizes RM solutions. Describe how you will make your business operational and differentiate from competitors. Business plan format & pitch.

- **New Tactic.** Propose, investigate, and speculate on the impact of a new type of revenue management concept or process on an existing business (e.g. options for airline tickets).
Project Evaluation

Project will be evaluated based on the following main aspects:

**Final Report: (70 %)** Reports will be evaluated for such factors as:

1 - Relevance of DPRM to the problem
2 - Clarity defining a problem/deficiency in selected subject with supporting data
3 - Analysis (accuracy, assumptions, model, appropriate use of class material)
4 - Providing case-originated, managerial recommendations
5 - Practical impact (potential)
6 - Originality
7 - Clarity and mechanics of presentation such as **organization, format, and grammar**

**Presentation: (30 %)** Presentation will be evaluated for such factors as:

1 - Content and Relevance: cover the key and important concepts, depth of information
2 - Public Speaking: good posture, easy to hear, little use of notes, no “ums” or “uhhs”
3 - Organization: flow of the presentation, logical progression, timing
4 - Professionalism: appearance, well prepared, confident demeanor
5 - Visual Aids: interesting not disturbing
6 - Comments/suggestions on other group’s presentation

**Paper/Case Presentation and Discussion: (15%)**

There will be multiple case or paper presentations performed by students (group presentation). When presenting a case the group will be asked to begin the discussion of the selected topic.

**Class Participation/Attendance: (15%)**

The key ingredient to your class participation grade is impact. This is a qualitative measure of your effective contribution to class discussion. Class sessions involve a mix of lectures and case discussions for which you are expected to do the pre-assigned readings, and prepare to discuss them in class. You are expected to be alert, original and contextual during discussion. Your solutions to the case questions will not be turned in for grading, but your participation will contribute to the corresponding part of your grade.

Criteria I will use to judge effective class participation include:

- Are points made relevant to the class discussion?
- Do the comments show clear evidence of appropriate and insightful analysis of the case data?
- Is there a willingness to test new ideas, or all comments are "safe"?
- Are they linked to the comments of others?
• Do comments clarify and highlight important aspects of earlier comments and lead to a clearer statement of the concepts being covered?
• Is the participant a good listener?
• Is the student arriving in class on time and attending the class consistently?

Students missing more than two sessions will get a failing grade from class participation.

Detailed Course Syllabus:

For each week the case to be covered and the readings are specified. All cases must be read before the class they are to be discussed in (whether a submission is required or not). Lectures will follow the recommended books mentioned above. Excerpts from these books are included in the case pack and are assigned as background reading with the material being covered.

Disclaimer: While the topics that I will cover and their emphasis will follow the description given below; I reserve the right to make some changes on the syllabus through the course of the semester.

August 26, 2006:

Introduction to Dynamic Pricing and Revenue Management

On the first session we will review the course outline. We will discuss the historical perspective of Dynamic Pricing and Revenue Management (DPRM). We will also discuss the key drivers and conditions for successful DPRM and its applications in various industries.

Read: 1- Introduction to RM - Ch. 1 of Talluri and van Ryzin 2004 (p.1-20)

2- Revenue management’s ability to control marketing, pricing and product development, Pinchuk, JRPM, 2002

Hand in: Student Profile

• Imagine that you are married with two children aged 5 and 9, you live in Cambridge, England, and are planning a family vacation to Barcelona. Your ideal is to leave London Stansted (the London airport most convenient to Cambridge) on Saturday morning, September 30 (2006), and return from Barcelona on Sunday evening, October 7. Visit the easyJet website http://www.easyjet.com/en/book/index.asp to determine the cost of round-trip air fare for your family, assuming that the tickets are purchased immediately. Does the information presented on the website motivate you to adjust your plan? Over the next 4 weeks you will be asked to re-visit the easyJet website and monitor changes in the price of this vacation.
**September 2, 2006:**

### Review of the Price Theory

We start to review the Price Theory including value pricing and opportunity costs.

**Mini-case:** Yahoo! Pricing search engine advertising, INSEAD 2006, (Prepare to discuss the suggested questions for the case)

**Read:** Introduction to PRO - Ch. 2.1-2.2 of Phillips 2005

**Click:** [The real value in setting the right price](https://www.ft.com/articles/300829f0-d75f-11de-a2f5-0202df118f68), Financial Times, Sept. 11, 2003


**Download:** Yahoo.xls from WebCT

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**September 9, 2006:**

### Multi-pricing in Segmented Markets

#### Nonlinear and Pick-load Pricing

We will discuss market segmentation, differential pricing strategies. We will also discuss nonlinear and peak-load pricing including: access fees, two part tariffs, lifeline rates, quality and quantity pricing. We also discuss the applications in telecom, insurance and internet services.

**Mini-case:** AT&T WorldNet (A), HBS Case 9-198-021, 1998, (Prepare to discuss the suggested questions for the case)

**Read:**
1. Pricing with market Power – Ch. 11.1-11.4 of Pindyck-Rubinfeld 2005
2. Price Differentiation - Ch. 4 of Phillips 2005

**Click:** [The secret to Google’s success](https://www.businessweek.com/magazine/content/06_13/b3930403.htm), Business Week Online, March 6, 2006


September 16, 2006:

<table>
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<th>Pricing, product positioning and design</th>
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<td>Versioning</td>
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We will discuss how to price a product line. We will also discuss imperfect segmentation and customer choice. I will also go over the project proposals with each group.

**Case:** Cambridge Software Corporation, HBR case 9-191-072, 1997, (Prepare to discuss the suggested questions for the case)

**Read:** Versioning: The Smart Way to Sell Information, Shapiro and Varian, 1998

**Hand in:** Assignment # 1: CSC Case report

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September 23, 2006:

| Introduction to Optimization and Linear Programming |

I will give you mini tutorials in optimization and linear programming. You will also learn how to model pricing problems.

**Hand in:** Project proposal


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September 30, 2006:

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<td>Demand Models</td>
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We will discuss optimal pricing under supply constraints. We will also discuss quantitative models of consumer demand.

**Mini-cases:**

1. Personal training at the NY Health Club, Columbia GSB 2006, (Prepare to discuss questions 1 and 2)
2. What price Vertigo? INSEAD Case 2006, (Focus on Question 2 and prepare a solution in Excel. Be ready to discuss Q. 1 and 3 as well)

**Read:** Pricing with Constrained Supply - Ch. 5 of Phillips 2005

**Click:**

- That invisible hand, NY Times, June 18, 2004
- How much did your seat cost, NY Times, July 20, 2003

**Download:** NYHCsurvey.xls from WebCT
October 7, 2006:

**Markdown Pricing Strategies**

**Dynamic Markdowns**

Topics to discuss will include: Timing and amount of markdowns, application in fashion industry. We will also play and debrief the Retailer game.

**Case/Simulation:** Retail pricing using Retailer, Broadie et al., in Practical Mgt. Science, 2000

**Read:**
1. Markdown Management - Ch. 10 of Phillips 2005
2. Welcome to the new world of merchandising, HBR November 2001
3. Retail RM &... merchandise optimization, Vinod, JRPM, 3:4, Jan. 2005

**Click:**
- *They know what you'll buy next summer*, CIO, May 1, 2002
- *Everything must go!*, CIO Magazine, May 1, 2002

**Download:** Retailer Game from WebCT (instructions + data file)

**Hand in:** Revised project proposal

October 14, 2006:

**Effective Multi-product Management**

**Bid Pricing**

**Combined Dynamic Pricing and Revenue Management**

We will discuss simultaneous pricing of multi-resource products, bundles and network products, static versus dynamic models, bid pricing model in RM, opportunity cost pricing, and combined dynamic pricing and revenue management. Examples include hotels, sports/events ticketing, vacation packages and petroleum.

**Cases:**
1. A Case of the Revenue Inn, Chen & Freimer, 2004
2. Dynamic Pricing at Petroleum Terminals, Harvey et al., 2004

**Read:**
1. Pricing with market Power – Ch. 11.5 of Pindyck-Rubinfeld 2005
2. Network management - Ch. 8.1-8.3 of Phillips 2005

**Click:**
- *Stanford shrinks stadium to boost ticket sales*, NY Times, Match 1st, 2006

**Download:** RonaldGarros.xls from WebCT

**Hand in:** Assignment # 2: Exercise Set
**October 21, 2006:**

**Dynamic Pricing via Capacity Control**

We will discuss inventory management under uncertainty, booking limits and protection levels, critical fractile solution and revenue estimation. Examples include Airlines, hotels, etc.

**Case/Simulation:** Easy Profit- your Revenue Management Pilot, INSEAD 2006

**Read:**
1. Introduction to the theory … Yield Management, Netessine & Shumsky, 2002
2. Yield Management at American Airlines, Smith et al., Interfaces 22, 1992

**Download:** Easy profit Simulation from WebCT (instructions + data files)

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**October 28, 2006:**

**Case Overview of DPRM**

**Project Progress Update**

We will discuss the Transportation National Group Case Study. Students will also present their project progress in front of the class.

**Case:** Transportation National Group, Columbia Business School, 1998, (Prepare to discuss the suggested questions for the case)

**Download:** TNG.xls from WebCT

**Hand in:** Assignment # 3: TNG Case report

**Project progress report**

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**November 4, 2006:**

**Strategies for Hedging Demand and Revenue risk**

**Royalty versus Profitability- RM meets CRM**

We will discuss contingent pricing, contracts, options, overselling and B2B challenges. We will discuss long vs. short term profitability, reconciling DPRM with customer retention. Examples include the gaming industry (casinos), media broadcasting, and cargo industry.

**Cases:**
1. Lufthansa Cargo AG, WHU case 2003, (Prepare to discuss the suggested questions for the case)
2. Harrah’s Entertainment, HBS case, 9-502-011, 2004, Prepare to discuss the following questions for the case:
   - T1. The effectiveness of the Data Base Marketing (DBM) programs.
T2. Why is it important to use customer worth in the DBM efforts rather than the observed level of play?

T3. How does Harrah’s integrate the various elements of its marketing strategy to deliver more than the results of DBM?

T4. Can Harrah’s strategy be replicated?

Read:  
1- Should Airlines and Hotels use Short Selling? OR/MS today, Oct. 2000  
2- Freight expectations, McKinsey Quarterly, 2002  
3- Revenue Management in fabulous Las Vegas, Hendler & Hendler, JRPM 2004  
4- Diamonds in the Data Mine, Loveman, HBR 2003  
5- From RM Concepts to Software Systems, Secomandi et al., Interfaces 32: 2, 2002

November 11, 2006:  
Group Meeting  
Teams will meet and work on their projects.

November 18, 2006:  
Final Presentations

November 25, 2006:  
Thanksgiving Holiday

December 2, 2006:  
Final Presentations  
Hand in: Final project report