NEW YORK UNIVERSITY
Leonard N. Stern School of Business

OPERATIONS

B01.2314

Spring 2005

Section 23: Monday & Wednesday 3:00 p.m. to 4:20 p.m.

Suggested Prerequisite Courses:
B01.1303 Firms and Markets
B01.1305 Statistics and Data Analysis
B01.1306 Financial Accounting and Reporting

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Office Hours: By Appointment.

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Admin Assistant: Tony Cifra 998-0282
COURSE MATERIALS


Case Packet:
Harvard Business School cases and notes
1. National Cranberry Cooperative (Abridged)
2. Delamere Vineyard
3. L. L. Bean, Inc.: Item Forecasting and Inventory Management
4. Fresh Connections
5. Pioneer Hi-Bred International, Inc.
6. Northco (A)
7. Ford Motor Company: Supply Chain Strategy

Additional Materials Packet. *Please pick up from near my office.*

Computer Software: HOM
Available for student use in the computing labs.
See instructions in Additional Materials Packet
INTRODUCTION

Operations strategy both supports and drives corporate and competitive strategy. It encompasses the wide array of issues that arise when managers attempt to answer the "How to?" questions that they face when formulating and implementing the overall strategy of any organization.

Operations management is the function that delivers. It translates the corporate and competitive strategy of all organizations into goods and services that customers demand, and pay for. Without operations management, corporate objectives cannot be achieved; at least not competitively.

OBJECTIVES

This is, in most cases, your first exposure to operations management concepts and techniques and, therefore, our goal will be only to expose you to the operations management function in, both, goods- and service-producing organizations. This course on operations management will not attempt to equip students with all of the necessary and detailed analytical skills that are required in the contemporary operations environment in order to function as an operations manager. Such advanced skills may be acquired in elective courses.

We will attempt to cover a wide variety of topics. Quantitative and qualitative methods of analyses will be discussed and used in the context of the cases and problems that we will use in this course. Note that there are several interesting problems in operations management that remain to be solved. As a consequence, heuristics are often used to obtain interim solutions.

COURSE FRAMEWORK

Sustainable competitive advantage comes from managing costs, revenues and investments. This course focuses on ways in which the operations function can contribute towards developing and sustaining cost, revenue and investment advantages. You are encouraged to approach this course from this perspective.

COURSE STANDARDS

At the outset, it is important to understand that the greatest value from graduate education is seldom realized immediately upon graduation. Such value, which is typically realized over a lifetime, comes not from having a "bag of tricks" but from developing analytical and executive skills. Also, the most valuable ability that you can develop, and sharpen, in graduate school is the ability to think, to read, to write, to speak, and to present your arguments logically.

Accordingly, this is not a lecture course and you are responsible for a large portion of your own development. You are required to not only attend classes but also to carefully prepare for each class, and contribute actively to class discussion of the assignments for each session. You will learn only when you participate fully in this learning endeavor.
The emphasis on case analysis makes it crucial that preparation for class be of consistently high quality. Preparation includes reading the assigned readings and cases, answering any assigned review and discussion questions and problems, analyzing cases, completing any templates, and formulating a plan of action to deal with the case situation. For each class meeting you should be prepared, if called upon, to make an organized presentation of your case analysis and/or problem solutions. It has been my experience that the best-prepared students are those who meet regularly with a group to discuss and prepare case assignments for class discussion. **Group discussion is strongly encouraged.**

Considerable value from this course is derived from classroom activities. **Regular attendance is vital.** Please arrive in time so that we may start class promptly.

**EVALUATION**

**POINTS earned for each segment of the course will be SUMMED to obtain a total score for the course. Students will be rank-ordered based on their total score to determine their course grade.**

Course grades will be determined as follows:

- Homework (3 Individual and 2 Group) 30%
- Mid-Term Examination 30%
- Final Examination 40%

**Homework (3 Individual -- #s 1, 4 & 5 and 2 Group -- #s 2, & 3)**

Please submit the five homework assignments at the start of class as indicated in the detailed syllabus below. Each assignment should be no longer than a one page executive summary plus attachments containing any absolutely necessary details. In each instance, I will evaluate effort and results. (For our purposes here only, getting it done and submitted on time is much more important than getting it right.) Each homework assignment is based on the readings and case for the respective session. In addition to time for reading and case analysis, budget about one hour on average to complete the homework. **Late submissions will not be accepted.**

**Class Contribution**

Effective class contribution involves activities that:

1. Lead to a productive start to the discussion,
2. Affect the discussion positively through the introduction or use of concepts and frameworks
3. Include carefully considered quantitative or qualitative analyses based on data
4. Challenge what appears to be "accepted wisdom",
5. **Do not repeat** what has already been said.

I will not evaluate your class contributions. However, I strongly encourage you to contribute actively in every class. Since I expect you to be fully prepared for each class, I may call upon you to start or manage the discussion or answer a specific question during the class in any session. If for some reason you are not fully prepared for a particular session, please let me
know before class so that I do not embarrass you inadvertently. I urge you to attend all classes, even if you are not adequately prepared. Please inform me if you will be unable to attend class.

**Mid-Term and Final Examinations**

The mid-term and final examinations are expected to include all of the material covered in this course until that time. They could be a combination of a short case, some problems and short essay questions. These examinations will be designed for you to demonstrate your understanding of the concepts, tools and techniques relevant to operations management. The mid-term examination will be held during the scheduled class on March 2, 2005. The final examination will be held during the scheduled time as announced by the registrar – during the exam week May 3 to May 10, 2005.

**Note on Grading**

Since managerial problems seldom have unique solutions, I will primarily look for compelling logic and reasoning in the analysis, practicality of recommended actions, the "value added" of any exhibits or analyses, and a clear and concise writing style. Since "cut and dried" solutions are not always possible, the grading process will be, in part, subjective but hopefully equitable.

**OFFICE HOURS**

Office hours will be held by appointment.

**CONCLUDING COMMENTS**

I will be prepared for class; I expect you to be prepared too. Also, I welcome your comments and constructive criticisms during the course on any aspects of your learning experience. I will be willing to discuss these in class and take appropriate actions that will enhance the "value-added" from this course. A suggestion form is included.
CLASS SCHEDULE

Given below is the SEQUENCE in which we will proceed. Note that this does not mean that we MUST COMPLETE each topic in the sessions indicated below. The course will proceed flexibly so that everyone is satisfied with its pace.

Please use the questions listed below for each case as a guide for preparing each case. Class discussion will, however, also cover many additional issues.

Session # | Topics and Assignments | Jan. 
---|---|---
Session 1 | Introduction to Operations | 24
Read: &nbsp;&nbsp;&nbsp;&nbsp;1. Begin reading The Goal. Plan on finishing it by the end of Session 7.

Session 2 | Competitive Strategy and Process Analysis | 26
HOMEWORK #1 DUE at start of class. For Kristen’s Cookie Company. Process-flow diagram, throughput time, bottlenecks, cycle time, capacity per day (of 4 hours).
Read: &nbsp;&nbsp;&nbsp;&nbsp;1. Text Chapter 4.
 &nbsp;&nbsp;&nbsp;&nbsp;2. Terms Used in Operations Management (See Additional Materials Packet).
 &nbsp;&nbsp;&nbsp;&nbsp;3. Analyzing Business Cases (See Additional Materials Packet).
Answer: Review and Discussion Questions. (See Additional Materials Packet)
Prepare: Kristen's Cookie Company (A) (See Text Chapter 4)
1. Prepare responses for the questions at the end of the case.

Session 3 | Jan. 31
Read: &nbsp;&nbsp;&nbsp;&nbsp;1. Text Chapter 5.
Answer: Review and Discussion Questions. (See Additional Materials Packet)
Prepare: Kristen's Cookie Company (A) (See Text Chapter 4)
1. Discussion Continued.
Prepare: The Best-Engineered Part is No Part (See Text Chapter 5).
Consider: How are pencils manufactured?

Session 4 | Product Design and Process Selection | Feb. 2
Read: &nbsp;&nbsp;&nbsp;&nbsp;1. Text Chapter 6S (Skim to page 369 just before Simplex Method. Carefully review Solved Problems 1 & 2.)
Prepare: Kristen's Cookie Company Continued (See Additional Materials Packet).
1. Answer the questions listed in KCC (Continued).
2. How can LP models help Kristen make decisions for her business?
3. What data would she need to use LP models? How should she collect the data?

• Templates are provided in this packet and on the course web site to assist you in your analysis.
Session 5  
Prepare:  Kristen's Cookie Company Continued (See Additional Materials Packet).
   1. Discussion Continued.

Session 6  
Introduction to Queuing and Simulation.  
Feb. 9  
Read:  Text Technical Notes 6 and 16.
Answer:  Review and Discussion Questions.

Session 7  
Feb 14  
HOMEWORK #2 DUE at start of class. Submit as a group. Questions 1, 2, and 3, 4 and 5 below.
Prepare:  National Cranberry Cooperative (Abridged)
   1. Draw a detailed process flow diagram for the process fruit operation of RP #1.
   2. Should the fifth dumper have been purchased? Justify your answer using a queuing analysis focused only on the dumpers.
   3. NCC is considering selling two dumpers to create more space for trucks waiting to unload. In addition, NCC is considering reserving one dumper for trucks bringing dry berries and the two remaining dumpers for trucks bringing wet berries. Evaluate these alternatives.
   4. Identify any bottlenecks in the process.
   5. Identify the problems at NCC. How severe are these problems?
   6. Develop and evaluate alternative solutions to those problems and recommend a plan of action. Conduct detailed numerical analyses where appropriate. To start, you may examine a day when 18,000 barrels arrive, of which 70% are wet. First, assume that trucks arrive evenly spaced throughout an 11-hour day and processing starts at 7:00 am.
   7. Repeat the analysis using the actual arrival schedule given in the case (reproduced in the additional materials packet for ease of reading and also available on the course web site) for a sample day. You can make the following assumptions:
      • 80% of the arrivals are wet berries
      • 10,000 barrels or more are received for 25 days in an year
      • 25 workers work overtime when needed to process berries.

   • Templates are provided in this packet and on the course web site to assist you in your analysis.

Session 8  
Feb 16  
Prepare:  National Cranberry Cooperative (Abridged)
   1. Discussion Continued.
**Session 9**  
Introduction to Project Management  
Feb. 23

**Read:**
1. Text Chapter 3.

**Answer:**
Review and Discussion Questions.

**Review:** **Skyscraper: Hypothetical Example and forms in additional materials packet.**
The following are major professions or trades involved in building a skyscraper. Please focus on these roles as you view the videotape. Note that all roles are not covered to the same extent in the videotape.

- Design, Architecture, Regulatory approvals and Project Management
- Earth Moving
- Roofing
- Metal Fabrication
- Carpentry
- Masonry and Stone Work
- Concrete Work
- Thermal Insulation
- Electrical, Air Conditioning, and Fire Protection
- Plumbing and Moisture Protection
- Elevators
- Painting and Interiors
- Flooring, Paving and Landscaping

**YOUR ASSIGNMENT**

1. **View the videotape** entitled "Skyscraper." **You will benefit from taking notes as you watch the videotape.** Please read the instructions below **before** viewing the videotape.

2. After viewing the videotape, **fill-in the Skyscraper Project form** (Additional materials packet) listing the various major tasks discussed or implied in the videotape, estimate their duration, and list those tasks that must precede each task. You may refer to library resources on the construction business and project management, consult with persons in the construction business, and collect data from primary and secondary sources to estimate how long it may take to complete each major activity in constructing a skyscraper.

3. **Develop a network diagram** for constructing a skyscraper and identify the critical path.

4. **Recommend** how the project could have been better managed.

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**Session 10**  
Feb. 28

**Prepare:** To discuss The Skyscraper.

**Prepare:** The Campus Wedding (A) and (B) (See Text Chapter 3)

1. Prepare responses for the questions at the end of the cases.

**Session 11**  
Mid-Term Examination  
Mar. 2

**NOTE:** Please bring a calculator. The Mid-Term Examination is expected to include all the material covered until now in this course. This is an open-book and open-notes exam.
Session 12  Introduction to Quality  Mar. 7

Read:  1. Text Chapter 7
Answer: Review and Discussion Questions.

Session 13  Customer Satisfaction and Quality Management  Mar 9

HOMEWORK #3 DUE at start of class. Submit as a group. Ritz-Carlton questions 1, 2, and 3 below.

2. Note on Process Improvement Methods. (See Additional Materials Packet)

Prepare:  The Ritz-Carlton Hotel Company: The Quest for Service Excellence. (See Additional Materials Packet) Additional data can be accessed from the course web site. Additional general information about the company can be found on the Ritz Carlton web site.

The Excel file ritz.xls on the course web site contains a listing of a subset of all defects reported in the DQPR (Daily Quality Problem Report) for the Ritz-Carlton Buckhead over the period from January 1997 to November 1997. The subset contains data for twelve categories of defects that directly impact the customer and are identified as causes for customer dissatisfaction.

Explanation of fields in the ritz.xls file:

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Unique ID number assigned to each defect in report</td>
</tr>
<tr>
<td>Date1</td>
<td>The date the defect was recorded in the DQPR</td>
</tr>
<tr>
<td>Date2</td>
<td>The date the defect occurred</td>
</tr>
<tr>
<td>Day of Week</td>
<td>Day of week when defect occurred</td>
</tr>
<tr>
<td>Time</td>
<td>The time the defect occurred</td>
</tr>
<tr>
<td>Count</td>
<td>The number of defects of this type</td>
</tr>
<tr>
<td>Keyword</td>
<td>The category of defect type that the defect is assigned to</td>
</tr>
<tr>
<td>Memo</td>
<td>Detailed description of the defect</td>
</tr>
<tr>
<td>Source</td>
<td>Source of information of this defect to the DQPR</td>
</tr>
<tr>
<td>Room</td>
<td>The room number of guest</td>
</tr>
<tr>
<td>Division</td>
<td>Division to which Department belongs</td>
</tr>
<tr>
<td>Department</td>
<td>Department where suspected cause of the defect</td>
</tr>
</tbody>
</table>

The "Summary Counts" worksheet contains total counts of defects by keyword for each date (Date 2). This workbook also has the occupancy data (estimated number of guests) in the hotel on each day. (See the tab at the bottom of your Excel screen.)

1. Does the data in the ritz.xls file indicate any significant quality problems?
   a. Construct a p-chart for all days from January through November. You may use the sample chart in SPC.xls on the course web site. (Note that the “sample size” varies each day.)
   b. Create Pareto charts for (Use Excel: Data/Pivot Table and Insert/Chart):
      i. all defects by keyword
      ii. all defects by day of the week
      iii. each defect by day of the week
      iv. any other useful Pareto charts
c. Give special attention to any days that were out of control. What days were out of control? What defects occurred on these out of control days?

2. If you were to select a category of defect to address from the DQPR data, for example Room Clean, which category would you address? Why?

3. Using the data and your common-sense knowledge of hotel operations, construct a Fishbone diagram for the possible root causes of the defect category that you selected. See the text for an example.

4. What additional data would be helpful to your analysis?

5. What other initiatives can The Ritz-Carlton Hotel Company take to make further improvements?

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**Session 14**  
**Prepare:** Delamere Vineyard

1. What are Delamere’s strengths and weaknesses? What does it deliver to customers that other vineyards do not? What does it take to be outstanding in the wine business?

2. What uncertainties does Richardson face?

3. What does quality mean in winemaking?

4. What principles and concepts should one apply to improving quality in a production system such as winemaking?

5. What should Richardson do? Should he pursue any of the quality improvement ideas he is considering?

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**Session 15**  
**Matching Supply and Demand. Inventory Policy.**

**HOMEWORK #4 DUE at start of class.** What should David Nutt do? Why?

**Read:**  
1. Text Chapter 14.

**Answer:**  
Review and Discussion Questions.

**Gather:**  
Data on the extent of inventory and the annual costs of managing and holding inventory in your current or previous firm or organization, or any other organization.

**Prepare:** The Nut Case (See Additional Materials Packet).

1. As David Nutt, prepare for your meeting with Peter on the weekend. Which ordering policy should David adopt?

- Templates are provided in this packet and on the course web site to assist you in your analysis.

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**Session 16**

**Prepare:** The Nut Case (See Additional Materials Packet).

1. Discussion Continued.
Session 17  Forecasting.  Mar. 30
Read:  1. Text Chapter 12.
Answer:  Review and Discussion Questions.

Session 18  Apr. 4
HOMEWORK #5 DUE at start of class. Answer questions 1 and 4 below.
Prepare:  L. L. Bean, Inc.: Item Forecasting and Inventory Management.
1. How significant (quantitatively) of a problem is the mismatch between supply and demand for L. L. Bean?
2. How does L. L. Bean use past demand data and a specific item forecast to decide how many units of that item to stock? Is this the best they can do?
3. What item costs and revenues are relevant to the decision of how many units of that item to stock? What inventory management method does L. L. Bean use?
4. The Excel file BeanItemData.xls on the course web site contains demand and forecast data for 84 items. Assume that L. L. Bean will use these data to plan their next season. Consider an item that retails for $45 and costs L. L. Bean $25. Its liquidation price is estimated to be $15. The sales forecast for this item is 12,000 units. What quantity should L. L. Bean order of this item?
5. How would you improve the forecasting and ordering processes at L. L. Bean?
6. Some items in L. L. Bean’s catalog are considered “staples.” Staples are carried every year and include items such as doormats, tote bags, gloves, hats and basic jackets. Some analysts believe that forecasting demand for such items requires different methods than the item forecasting methods described in the case.
◊ What factors would you consider in selecting forecasting methods for such staple items?
◊ What forecasting method(s) would you recommend to L. L. Bean for such staple items?
◊ Use the method(s) you recommend and the historical data for the years 1988 to 1991 (NOTE: DO NOT USE THE 1992 DATA) for one type of doormats in the Excel file BeanDoormats.xls on the course web site to forecast monthly demand for this item for 1992 (January to December).
◊ Also compute forecast errors for the first five months of 1992 for the method(s) you recommend.

NOTES: Please use HOM or Excel to compute forecasts for doormats.
1. The following methods can be easily implemented in HOM and Excel: simple average, 3-month moving average, simple exponential smoothing, and linear regression.
2. In addition, HOM can be used for several additional methods, including exponential smoothing with linear trend, and exponential smoothing with linear trend and smoothed seasonal adjustment.
3. If you use "Best Fit" within HOM, you will get results different from those in the solutions to templates. This is because HOM minimizes Mean Square Error when finding the best fit while the solutions were computed by minimizing MAD. We will discuss the implications of these choices in class.

4. Some of the notation differs between the Book, the Templates and HOM for the smoothing constants used in forecasting.
   - The Book uses Alpha and Delta and it does not use a smoothing constant for Seasonality.
   - The Templates refer to Alpha, Beta and Gamma respectively.
   - HOM uses Data, Trend and Seasonal respectively.
   - Please keep these differences in mind as you analyze L. L. Bean, Inc.

Templates are provided in this packet and on the course web site to assist you in your analysis.

<table>
<thead>
<tr>
<th>Session 19</th>
<th>Improving Business Performance: Operations and Profitability. Apr. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare:</td>
<td>Manzana Insurance - Fruitvale Branch (See Additional Materials Packet).</td>
</tr>
<tr>
<td></td>
<td>1. What is the basis of competition in the market that Fruitvale serves?</td>
</tr>
<tr>
<td></td>
<td>2. What are the most important measures of operating performance for the Fruitvale branch? How is it doing on those measures? Why have profits been deteriorating over the past several quarters?</td>
</tr>
<tr>
<td></td>
<td>3. What is your assessment of the rules used to assign priorities and to guide operations at Fruitvale?</td>
</tr>
<tr>
<td></td>
<td>4. As Bill Pippin, what alternatives should you consider, what data should you gather and analyze, what analytical methods should you use, and what recommendations would you make to John Lombard to improve performance?</td>
</tr>
</tbody>
</table>

Templates are provided in this packet and on the course web site to assist you in your analysis.

<table>
<thead>
<tr>
<th>Session 20</th>
<th>Apr. 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare:</td>
<td>Manzana Insurance - Fruitvale Branch (See Additional Materials Packet).</td>
</tr>
<tr>
<td></td>
<td>1. Discussion Continued.</td>
</tr>
</tbody>
</table>
Session 21  Apr. 13
Prepare:  Fresh Connections
1. What are the most important strategic and operating issues facing Fresh Connections?
2. Which segment of the prepared foods market is most attractive for Fresh Connections?
3. What is Fresh Connections’ value proposition in terms of results produced for customers?
4. How will growth impact Fresh Connections?
5. What are important features of Fresh Connections’ operations processes and investments?
6. How should the firm address the many issues it faces?

Session 22  Apr. 18
Prepare:  Fresh Connections
1. Discussion Continued.

Session 23  Apr. 20
Read: 1. Text Chapter 9.
Prepare:  Pioneer Hi-Bred International
1. Why was John Smith so apprehensive about the 1998 production plan? How would uncertainty of forecast demand and production yield affect the supply management decisions at Pioneer?
2. What should John Smith do about the 33% safety stock? What would be the impact on the 1998 plan if the safety stock inventory was reduced to 20%? How would changing production yields affect the safety stock decision?
3. What should John Smith do about Northern Hemisphere production and off-season production?
4. What should John Smith do about overseas production issues?
5. Who should open discussion in response to John Smith’s invitation? Why? What should he or she say?

Session 24  Apr. 25
Re-Read: 1. Text Chapter 6S (Entire Chapter.)
Prepare:  Pioneer Hi-Bred International
1. Discussion Continued.
2. How would the LP model help John Smith make such decisions as the overproduction rate and overseas production?
3. What are the advantages and disadvantages (limitations) of the LP model in the current case?
4. How sensitive is the optimal solution to changes in the cost coefficients and the RHS limits of the constraints in the LP model?
5. How can the LP model be improved?
Session 25  
**Prepare:** Northco (A)  
1. What makes it difficult for Northco to match supply with demand? How should Michaels think about the costs of over- or under-stocking? What factors affect these costs in this case?  
2. How can Northco improve in matching supply with demand?

Session 26  
**Prepare:** Ford Motor Company: Supply Chain Strategy  
1. Consider the experiences that you (or your friends or members of your family) have had in buying a car. Compare these to the experience of buying a computer online. If you have never done this, go to Dell’s website – [www.dell.com](http://www.dell.com) – and explore how online computer buying works. What are the differences? Why do they exist?  
2. What advantages, if any, does Dell derive from virtual integration? How important are these advantages in the auto business?  
3. What unique challenges does Ford face that are not also faced by Dell? How should Ford deal with these challenges?  
4. What should Teri Takai recommend? To what degree, if any, should Ford emulate Dell’s model?  
5. What can Dell learn from Ford?

**Final Session Final Examination**  
**TBA. May 3 to May 10**

**NOTE:** Please bring a calculator. The Final Examination is expected to include all the material covered in this course. This is an open-book exam.