Competitive Advantage from Operations
Course Syllabus B01.2314
(Subject to Revisions)

COURSE DESCRIPTION:
This course serves as an introduction to Operations Management. The coverage of the
discipline is very selective: We concentrate on a small number of powerful themes that have emerged recently as the central building blocks of world-class operations. We also present a sample of operations management tools and techniques that have been proved extremely useful over the years. The topics are equally relevant in the manufacturing and service sectors.

INSTRUCTOR: René Caldentey, KMC 8-77, (212) 998-0298 rcaldent@stern.nyu.edu
OFFICE HOURS: Mondays and Wednesdays 5:00-6:00pm or by appointments

CLASS MEETINGS: Mondays and Wednesdays 3:00-4:20pm
Room KMC 3-65

TEACHING ASSISTANT: Karel Bourgois (karel.bourgois@stern.nyu.edu)
OFFICE HOURS: Tuesdays and Thursday 4:30-5:30pm or by appointments
Room KMC 8-172 (Tutoring Space)

COURSE WEBSITE: Blackboard (http://sternclasses.nyu.edu/).

COMPUTER SOFTWARE: EXCEL
MATERIALS REQUIRED (Buy in bookstore)

1. COMPETITIVE ADVANTAGE from OPERATIONS
(Also called CUSTOM-TEXT in this Syllabus)
A customized version with selected chapters from Operations Management for
Competitive Advantage; Chase, Aquilano and Jacobs; Eleventh Edition; McGraw-Hill
Irwin; 2005; and selected material from Operations Management; Stevenson; 8th Edition;

2. CASES & READINGS:
Includes the following cases:
- Competing on Capabilities
- Benihana Of Tokyo
- Donner Company
- National Cranberry
- Blanchard Importing and Distributing Company, Inc.
- L.L. Bean, Inc.
- Toyota Motor Manufacturing, USA Inc.

The rest of the cases and readings will be distributed in class, and some can be
downloaded from the course web site. I will also post slides (and selected lecture notes)
on the course website prior to each class.

3. BOOK

OTHER OPERATIONS MANAGEMENT REFERENCES (Optional):
• Operations Management for Competitive Advantage (Tenth Edition), by Chase, Aquilano
  and Jacobs, Irwin / McGraw-Hill.
• Designing and Managing the Supply Chain: Concepts, Strategies, and Cases, by

GRADING COMPONENTS
• Short Papers (Group Homework) 20%
• Class Participation 15%
• Midterm Exams 30%
• Final Exam 35%

Please read the following descriptions very carefully (further details at the end of this syllabus)

Group Homework:
• There are nine homework assignments to be done in groups of maximum four students.
  Assignments 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.
• 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.
## CLASS SCHEDULE

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Module I: Introduction to Operating Systems: Process Design and Analysis

SESSION 1 – Wed Sept 6th: Introduction to Operations Strategy

Readings

1. Begin reading The Goal by E.M. Goldratt

Virtual Plant Tours

In this class, we will study different types of operating processes and discuss their suitability for producing various goods and services. Some of these processes and products are illustrated in about 50 virtual PLANT TOURS accessible from the website http://www.mhhe.com/omc/tours-frames.htm.

Study the following two tours and answer the questions that follow:

1. Stickley furniture (http://www.stickley.com/): Job shop. Follow the links to the factory tour and the video tour (12 mins).

Questions

1. Identify the key elements of each company’s business strategy.
2. Identify the key elements of each company’s operating system. The operating system is the collection of all processes that a company uses to produce/deliver the goods and services that it offers.
3. What are the differences between the operating systems of the three firms?
4. What is your assessment of the fit between each company’s business strategy and its operations strategy?

SESSION 2 - Mon Sep 11th: The Link between Operations Strategy and Processes

Case: Benihana of Tokyo (Included in case Course-packet)

Reading

Competing on Capabilities: The New Rules of Corporate Strategy (Included in case Course-packet)

Questions

Benihana of Tokyo is a "classic" case that provides a close look at all aspects of an operating system, and illustrates the fit between the operations strategy and corporate strategy. Use the following questions as guidelines in reading and analyzing this case.

1. What are the key elements of the Benihana concept?
2. Identify all the processes in the Benihana operating system from the time when a customer enters the restaurant to when the customer leaves the restaurant. For each process, identify its input, output, and performance characteristics.
3. How does the operating system support the Benihana concept?
4. How does the Benihana cost structure compare to the standard American restaurant? Explain the differences.

Related Links

Benihana commercials: http://www.benihana.com/commercials.asp
SESSION 3 – Wed Sep 13th : Process Flow Analysis I: Bottlenecks

Case: KRISTEN'S COOKIE COMPANY (Distributed in class)

Readings
1. Read Chapter 5: "Process Analysis" in Custom-Text.

Assignment 1
a) Draw a process flow diagram for the operating system in Kristen’s Cookie Co. Assuming that each order is a custom order for one dozen cookies. Compute the cycle time, throughput time, and capacity for each process in the system and for the entire operating system.
b) Identify ALL possible bottlenecks. Explain.

SESSION 4 – Mon Sept 18th : Process Flow Analysis II: Setup Time and Batching

Case: DONNER COMPANY (Included in case Course-packet)

Reading
1. Read Chapter 11: "Strategic Capacity Management" in Custom-Text.
2. Read "Analysis of an Operation" (available on course website)

Assignment 2
Suppose that Donner accepts an order of 80 circuit boards (i.e., 10 panels). Follow the order from start to finish, computing its cycle time and throughput time in each process of the operating system. Use case facts to decide which machine to use for processes that can be done on more than one machine (e.g., Manual drill versus CNC drill). Your decisions should mirror what Donner would actually do in such cases. What is the total time taken to process the order?

SESSION 5 – Wed Sept 20th : Service Operations

Readings: Framework for Analyzing Service Operations (available on course website)

Topics:
- Distinctive Aspects of Service Management
  - Intangibility, Perishability, Heterogeneity, Simultaneity
- Matching Supply and Demand

Module II: Optimal Resource Allocation

SESSION 6 – Mon Sept 25th : Linear Programming: Basic Concepts

Readings
Read the last chapter on the Custom-Text on Linear Programming (p. 807-822). This part of the chapter introduces linear programming and explains "Model Formulation" and the "Graphical Solution Procedure." We will discuss these topics in class.

Questions
Attempt to formulate linear programs for problems 3-5 from the chapter. (p.833). Notice that all three problems involve similar types of decisions. These problems are called product-mix problems. We will use these problems to illustrate the LP methodology in this class. In the subsequent classes, we will introduce other decision problems where LP is useful.

After this class, graphically solve practice problems 1-5 in the Problem Set.
SESSION 7 – Wed Sept 27th: Linear Programming: Sensitivity Analysis

Readings
Read the rest of the chapter on Linear Programming (p.823-829). This part of the chapter explains how to set up and solve a linear program in Microsoft Excel.

Questions
Solve all the problems in the Linear Programming Problem Set in Microsoft Excel.

SESSION 8 – Wed Oct 4th: Linear Programming: Application

Case: PARADISE JUICE COMPANY (available on course website)

Assignment 3
Submit your answers to the questions at the end of Part 1(a-e) of the Paradise Juice Company case. Submit the computer output necessary to support your conclusions as exhibits.

SESSION 9 – Mon Oct 9th: MIDTERM EXAM I

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.

Module III: Managing for Competitive Advantage

SESSION 10 – Wed Oct 11th: Time Based Competition - Introduction to Project Management

Caselets
Two Project Management Exercises (see course website): FCN Securities Demo (A) and Allied Distributing.

Reading
Read Chapter 3: "Project Management" in Custom-Text.

Questions
Draw the networks for the projects described in the FCN/Securities Demo (A) exercise, and the Allied Distributing exercise.

SESSION 11 – Mon Oct 16th: Project Management Under Uncertainty

Caselets
Four Project Management Exercises (see the course website): FCN Securities (B), FCN Securities (C), Specialty Contractors, Aerospace Components.

Questions
Read, analyze and be prepared to discuss these project management network caselets.
Assignment 4
Submit your analysis of the Specialty Contractors, Inc. exercise including the "optimal crash" with respect to the minimum cost alternative, the crash costs, and penalty costs involved.

Additional Links
Movie on Project Management in the Construction of the Alton Bridge over the Mississippi. (14 mins)
http://sterntv.stern.nyu.edu:8080/ramgen/faculty/Project-Management-The-Alton-Bridge.rm

SESSION 12 – Wed Oct 18th: The Effect of Uncertainty: Introduction to Queuing
Readings
1. Read "Supplementary Notes on Queuing Systems" on the course website.
2. Read Technical Note 7: "Waiting Line Management" in Custom-Text (p. 288)

SESSION 13 – Mon Oct 23rd: Queuing Theory Concepts
Readings:
Managing Real and Virtual Waits in Hospitality and Service Organizations (available on course website)

Questions
Solve the exercise problems given in "Supplementary Notes on Queuing Systems."

SESSION 14 – Wed Oct 14th: Queuing Theory in Action
Case
FIRST CITY NATIONAL BANK (available on the course website)

Assignment 5
Calculate the waiting time for a customer (time in the queue before service) for each line configuration for each half hour for a super-peak day. Thus, determine which of the two line configurations you would recommend, and the number of tellers you would use to staff the system. Support your result with the appropriate quantitative queuing analysis. You do not need to submit all of the computer output. The relevant results and the answer to the question will suffice.

You may use the spreadsheet on the website to compute the performance measures for each line configuration. (Make sure that you also know how to do computations by hand, since the spreadsheet will not be provided for the exam.)

Downloads
First City National Bank Case Study
Spreadsheet to compute performance measures
Module IV: Total Quality Management

SESSION 15 – Mon Oct 30th: Process Improvement – Introduction to Quality

Cases
TOYOTA MOTOR MANUFACTURING, USA INC. (available on Course-Packet)
FORD-FIRESTONE. (available on course website)

Questions

**Toyota Case**
1. What are the principal components of the Toyota Production System? What capabilities must an organization possess in order to implement TPS effectively?
2. How does 'quality control' work at Toyota Motor Manufacturing?
3. As Doug Friesen, what would you do to address the seat problem? What options exist? Where would you focus your attention and solution efforts? What would you recommend and why?

**Ford-Firestone**
4. Is the situation serious? At what point in time? How did it happen? Who is responsible? How companies react to the problem? Could it have been prevented?
5. How can we know if a rollover is caused by a defective tire?
6. When the manufacturer is the responsible for a tire failure?

SESSION 16 – Wed Nov 1st: Introduction to Six Sigma Principles - Statistical Quality Control

Readings
1. Read Chapter 8: "Total Quality Management: Focus on Six Sigma" in Custom-Text
2. Read Technical Note 8: "Process Capability and Statistical Quality Control" in Custom-Text (p.346)

SESSION 17 – Mon Nov 6th: Six Sigma Principles (continued) - The Cost of Quality

Case SOUTH TREE ELECTRONICS (see course website)

Questions
Read, analyze and be prepared to discuss the quality control issues in the South Tree Electronics exercise. In analyzing South Tree's quality control problems, answer the following questions:

1. Indicate on a process diagram, all current inspection points and note the accumulated cost and yield of each operation and test in the process.
2. How much does a good S-39 circuit cost?
3. At what yield rate would you be indifferent between continuing and discontinuing the first inspection in the process?

Assignment 6
At what yield rate would you be indifferent between continuing and discontinuing the first inspection in the process? Show all the work and identify any assumptions used.

SESSION 18 – Wed Nov 8th: MIDTERM EXAM II

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.
Module V: Inventory and Supply Chain Management

SESSION 19 – Mon Nov 13th: Demand Forecasting
Case: BLANCHARD IMPORTING AND DISTRIBUTING COMPANY, INC. (Included in the Course-packet)
Reading
Read Chapter 13: "Forecasting" in Custom-Text to get familiar with the issues in forecasting and the differences between the techniques available for forecasting. You do not need to memorize any of the formulas.

Questions
Use the following questions to analyze Blanchard’s demand data:
1. What is the purpose of forecasting and what are the main aspects of a "good forecast"?
2. Considering the sales patterns for the Blanchard products, how should Blanchard forecast its demand?
3. Apply and test your methodology on the data given in Exhibit 5 of the case.

After addressing these questions, we will introduce a simple inventory model called the EOQ model in this class. The next class will discuss this model in depth.

SESSION 20 – Wed Nov 15th: The Role and Cost Economics of Inventory
Case: BLANCHARD IMPORTING AND DISTRIBUTING COMPANY, INC. (Included in the Course-packet)
Reading
Read Chapter 15: "Inventory Control" in Custom-Text
We will study the 'Fixed Order Quantity Model' in detail in this class. This is the same as the EOQ/ROP model used by Blanchard.

Questions
Although the EOQ/ROP (or, more appropriately, ELS) system may not be appropriate for Blanchard because of the inapplicability of the basic theoretical assumptions (which ones?), it is instructive to consider the operational feasibility of an EOQ/ROP system. Select Blanchard Vodka in quarts as an example product, and calculate the ELS for this product. What would be the inventory policy that would result from this calculation?

Assignment 7
Carefully study the discussion that Hank has with Bob and Eliot towards the end of the case and answer the following questions:
1. Is an EOQ/ROP model suitable for Blanchard? Why or why not?
2. How does the method of Bob and Eliot differ from the EOQ/ROP method?

SESSION 21 – Mon Nov 20th: Inventory Management under Uncertainty
Case:
L. L. BEAN, INC.: ITEM FORECASTING AND INVENTORY MANAGEMENT (Included in the Course-packet)
Reading
Read "A Note on the Newsvendor Model: Inventory Planning for Short Lifecycle Items." (pdf available on course website)
Questions
1. What are the challenges facing LL Bean in meeting demand for their products?
2. How does LL 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 an item to stock?
4. How would you address the concerns of Rol Fessenden and Mark Fasold towards the end of the case?
5. How would you improve the forecasting and ordering process at LL Bean?

Assignment 8

The Excel file, LLBean.xls, attached in course website, contains demand and forecast data for 84 items. Suppose that these are the data that LL Bean will use to plan their next season. Consider an item that retails for $45 and costs LL Bean $25. The liquidation price for this item is estimated to be $15. The sales forecast for this item is 12,000 units. What order quantity should LL Bean choose for this item?

SESSION 22 – Mon Nov 27th: Use of Information in the Supply Chain

Readings

1. Read Chapter 10: “Supply Chain Strategy” in Custom-Text

Questions

In this class, we will draw inferences on supply chain performance from the beer game. Read the above articles, and use the following questions as guidelines to prepare for the class:

1. What problems did you face in meeting demand during the game?
2. In retrospect, how should you have determined your order quantities in every period in order to improve performance?
3. What information from your downstream and upstream players would have been useful in improving the performance of your supply chain?

SESSION 23 – Wed Nov 29th: Supply Chain Management

Readings Zara: Fast Fashion (To be distributed in class)

Questions:

1. What is Zara value proposition to customers?
2. How is Zara’s Supply Chain helping this value proposition?
3. How is Zara managing the uncertainty in demand?
4. Under the Newsvendor paradigm, how would you compare the Overage and Underage costs of Zara and Gap?

Module VI: New Topics in Operations

SESSION 24 – Mon Dec 4th: Revenue Management

SESSION 25 – Wed Dec 6th: Risk Management in Operations

Assignment 9 T.B.A.

SESSION 26 – Mon Dec 11th: Wrap-up and Final Review

The review session will be based on your questions that should be prepared prior to class.

FINAL EXAM 14-dec-2006 13:30-15:30
HOMEWORK

There will be nine (9) homework assignments throughout the semester (in Sessions 3, 4, 8, 11, 14, 17, 20, 21 and 25). These assignments are a combination of analysis and brief explanations, and are designated as SHORT PAPERS. They should be no more than two pages in length (except where noted) and be submitted at the beginning of the session on which they are due. Keep a copy for your reference during class. Show all work if your response is a calculation. It will be helpful to read the assignment for the next week prior to class. If you have questions regarding the next assignment we can discuss them in class.

The Short Papers should be submitted by your group, and all members are expected to participate in each assignment, and understand anything that is presented in your group paper. If you miss your group meeting and/or do not participate in the assignment, you are expected to do the work on your own, and submit it separately.

The assignments have two purposes: some of them are meant to enable you to apply concepts and tools learned in the course, and others are designed to help you prepare for class. All assignments will be graded, and the grader will determine whether a submission represents a good faith effort to complete the work. The accuracy of the responses will be judged to the extent that concepts have been covered in class before the assignment due date.

We encourage all students to prepare for class in groups even when there is no assignment for submission.

CLASS PARTICIPATION

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
• 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.