COURSE INTRODUCTION

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Course Overview and Objectives

This course introduces concepts and techniques related to the design, planning, control and improvement of service and manufacturing operations. The course attempts to make you conversant in the language of operations management, provide you with quantitative and qualitative tools to analyze basic operations issues, and allow you to see the role of operations management in the overall strategy of the firm. We will cover topics in process analysis, quality management, inventory and supply chain management and operations strategy.

Grading

Your course grade will be determined as follows:

- Class participation: 25%
- Written assignments: 20%
- Real world paper: 25%
- Final exam: 30%

Class Preparation

Most class sessions require that you thoroughly prepare for a case discussion following the questions provided in the syllabus as guidelines. You should expect to be “cold called”. You are welcome to discuss the cases with your study groups. If exceptional circumstances leave you unprepared for a case discussion, please let the instructor know before class begins.

The class participation portion of your grade will be based on the extent to which you demonstrate that you are prepared, the relevance and depth of your comments, and the degree to which you listen carefully and respond to your peers. Use of a laptop computer for anything unrelated to the course during class time will adversely affect this portion of your grade as will failure to attend the class.

Written Assignments

There are three written assignments based on: process analysis, quality management and inventory management. The problem sets will provide you with an opportunity to make sure you understand the tools and techniques taught in class, and to think about how you
might apply them in your own organization. The problem sets will be posted on the course website and handed out in the block before the one in which they are due. Problem sets are due by the end of class on 2/26, 3/17 and 4/7. Problem sets are to be completed on your own.

Real Life Operations Paper
Operations management issues are present in just about any profession you may choose to pursue. Law firms must manage caseloads and capacity to execute against them, real estate managers must determine how much property (inventory) they should have at any given point in time, and internet-based organizations must understand the rate of hits on their servers, for example. To help you better connect this class to a field in which you are interested, we ask that either on your own or with your study group write a short (five-page) description and analysis of an operations issue in your particular field of interest. To develop the paper, you should contact an organization (the organization in which you work is fine), and either speak with them or observe them to understand a specific operations issue in one of the areas we will study – process flow/capacity analysis, quality management, inventory and production control or supply chain management. Your paper should provide a relatively detailed account of a particular operations issue, including numbers and a clear description of the approach taken to deal with that operations issue. We are not looking for descriptions of the way others have solved problems, but rather for you to engage in the problem solving process yourself. This paper is due no later than Monday, April 18th.

Examples of topics chosen by prior classes include:
- Application of Six Sigma analysis at JPMorgan
- Supply Chain Process Model for BioTech Production
- Defect and Quality Analysis of OpSource Pre-Sales Support Process
- Software Defect Analysis using c-charts
- Innovative Approaches to Operational Efficiency at McCarran Airport
- DigiDesign Call Center Analysis
- Analysis of New Product Development Process at eBay

Final Exam
There will be a comprehensive final exam at the end of the semester on which you will be expected to show your knowledge of all materials presented in the course. Executing the written assignments and preparing the material for each class will be critical to performance on the final exam.
<table>
<thead>
<tr>
<th>Class</th>
<th>Topic Area</th>
<th>Reading and Cases to Prepare for Class Discussion</th>
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<tbody>
<tr>
<td>BLOCK ONE</td>
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| 1/13 9 - 12 | Introduction | Case: Southwest Airlines in Baltimore  
Read: “Deep Change: How Operational Innovation Can Transform Your Company” |
| 1/14 4:30 – 7:30 | Process and Capacity Analysis | Case: Kristen’s Cookie Company (A)  
Case: Shouldice Hospital Limited  
Read: Production Processes (Columbia) |
| 2/3 9 – 12 | Queue Analysis and Management | Case: Manzana Insurance  
Read: Note on Queuing (Haas) |
| 2/4 8:30 – 11:30 | Quality Management Approaches and Tools | Case: Florida Power and Light Story Exercise (A)  
Read: Statistical Process Control (Columbia)  
Reference: The Memory Jogger 2: Tools for Continuous Improvement and Effective Planning |
| 2/26 9 - 12 | Quality Management and Systems Thinking | Case: The Ritz-Carlton Hotel Company: The Quest for Service Excellence  
Read: System Dynamics Modeling – Tools for Learning in a Complex World  
Problem Set #1 DUE: Process Analysis |
| 3/17 9 - 12 | Inventory Management Newsboy Problem | Case: Sport Obermeyer  
Read: Note on Optimal Ordering Strategies and Supply Chain Coordination  
Problem Set #2 DUE: Quality Management |
| 3/17 4:30 – 7:30 | Supply Chain Management | No preparation |
| 4/7 9 - 12 | Management Systems: Lean Class Summary | Case: Lean at Wipro Technologies  
Reference: A just-in-time approach to medical care  
http://www4.gsb.columbia.edu/ideasatwork/feature/70138/A+just-in-time+approach+to+medical+care  
Problem Set #3 DUE: Inventory Management |
| 4/9 | FINAL EXAM 9 a.m. – 12 p.m. |
Session 1: January 13th, 9 a.m. – 12 p.m.
Introduction to Operations Management

Case: Southwest Airlines in Baltimore
Read: Deep Change – How Operational Innovation Can Transform Your Company

The Southwest Airlines case describes the well-known elements of Southwest’s operating strategy as well as the details of the organization, processes and information flows required to turn around a plane. This allows you to analyze the process, and establish the link between strategic choices and operations implications.

Answer the following questions as you prepare the case:
1. How does Southwest Airlines (SWA) compete? What are its advantages relative to other airlines?
2. The plane turnaround process requires coordination among twelve functional groups at SWA to service, in a brief period of time, an incoming plane and match it up with its new passengers and baggage for a prompt departure. Evaluate the plane turnaround process at Baltimore – resource utilization, capacity, bottlenecks, information flows, etc. How is the process working?
3. Why is operational performance at Baltimore eroding? What issues need action?
4. What would you recommend Matt Hafner do?

Session 2: January 14th, 4:30 – 7:30 p.m.
Process and Capacity Analysis

Case: Kristen’s Cookies (A)
Case: Shouldice Hospital Limited
Read: Production Processes

This session introduces the standard tool of process analysis, the process flowchart. It also defines basic terms: set-up time, run time, throughput time, cycle time, capacity utilization, labor content and capacity.

The Kristen’s Cookie Company case puts you in the position of being about to open a cookie baking business that you will operate from your apartment. You are asked to analyze the design of this simple process. Using the standard tools of process analysis you will gain insight into whether or not the process will work, how well it will work, how much it will cost, and what improvements are possible. After reading the Kristen’s Cookie Company case, take a first pass at answering the following questions in preparation for class discussion. We’ll develop the answers fully in class:
1. Prepare a process flowchart including all of the critical information.
2. How many orders can you fill in a night assuming you are open for four hours?
3. Suppose a customer calls in and must receive her order right away. How quickly can you fill the rush order?
4. How much of you and your roommate’s time will it take to fill each order?
5. Because your baking trays can hold exactly one dozen cookies, you will produce and sell cookies by the dozen. Should you give any discount for people who order two dozen cookies, three dozen cookies, or more? If so, how much?
6. What is the effect of adding another oven? How much would you be willing to pay to rent an additional oven?

The Shouldice Hospital case examines similar issues, but in a service setting. Prepare to answer the following questions as you read the case:
1. How has Shouldice designed its service process to support the value proposition it offers to customers? In particular, what process design choices contribute to high efficiency and productivity?
2. What is the resource that is limiting the rate at which Shouldice can serve customers? Attempt a back-of-the-envelope analysis to identify this bottleneck.
3. What are the advantages and disadvantages of each of the options proposed for increasing capacity? Develop a point of view on which option is most attractive.

Session 3: February 3rd, 9 a.m. – 12 p.m.

Case: Manzana Insurance – Fruitvale Branch
Read: Note on Queuing (Haas)

The Kristen’s Cookie Company and Shouldice Hospital cases examined processes operating without variability. In this session we’ll introduce queuing tools that allow you to assess processes that do operate with variability.

To prepare the Manzana Insurance case for class, consider the following questions:
1. Who are Manzana’s customers, and what is the basis of competition?
2. What operational problems is Manzana facing? How might they be connected to the deteriorating profits experienced over the past year?
3. What are some possible alternatives for improving Manzana’s performance? How might these specifically help to eliminate the causes of the problems facing Manzana?

Session 4: February 4th, 8:30 – 11:30 a.m.
Quality Management: Basic Tools and Methods

Case: Florida Power and Light Story Exercise (A)
Read: Statistical Process Control
Reference: The Problem Solving Memory Jogger’s Seven Steps to Improved Processes

In this session, we’ll introduce the basic tools of quality management, and in particular we’ll focus on statistical process control charts. We’ll start with the Florida Power & Light case to show how the tools are used in a problem solving process.
The case study and exercise describe a large-scale, company-wide quality improvement program (QIP) at Florida Power & Light Company (FP&L). FP&L’s QIP has been praised as one of the best in the United States. The case provides a strategic perspective of FP&L’s QIP. The exercise brings to life the methodology used by FP&L to make quality improvement happen, and allows you to see the implementation of the basic quality tools. In particular, the exercise presents an application of the heart of FP&L’s QIP, a problem-solving mechanism known as a quality improvement story. To prepare the case, answer the following questions:

1. What are the strengths and weaknesses of FP&L’s QIP?
2. What factors are responsible for the success of FP&L’s QIP? Consider both organizational issues and contextual factors.
3. What are the characteristics of businesses in which an FP&L-style program is appropriate? Inappropriate?
4. WITH YOUR STUDY GROUP, GO THROUGH THE EXERCISE, STOPPING TO ANSWER EACH QUESTION BEFORE CONTINUING. TRY TO IMAGINE WHAT IT WOULD ACTUALLY BE LIKE TO BE ON THE TEAM.

Session 5: February 26th, 9 a.m. – 12 p.m.
Quality Management: Systems Thinking

Case: The Ritz-Carlton Hotel Company – The Quest for Service Excellence
Read: System Dynamics Modeling – Tools for Learning in a Complex World

We’ll close our conversation about quality management by examining the implementation of a quality program at the Ritz-Carlton. The Ritz-Carlton Hotel Company case describes the integrated quality management system that the Ritz Carlton employs, and how it was able to win the Malcolm Baldridge National Quality Award. You are asked at the end of the case to help personnel at Ritz-Carlton Buckhead analyze some quality data they have and help them chart their future actions. See the specific questions at the end of the case. The spreadsheet with the data you will need to do your analysis can be found on the course website. Please note that you can spend a LOT of time playing with this data. Be thoughtful about the analyses you want to do, and what questions you are trying to answer as you do the analysis. Consider the systems nature of quality management and how systems dynamics modeling can help you think through them.

Session 6: February 26th, 1 p.m. – 4 p.m.
Inventory Management: EOQ and Reorder Point Models

Case: HP DeskJet
Read: Managing Inventories – What is the Appropriate Order Quantity?
Read: Managing Inventories – Reorder Point System

We’ll start a new module on production and inventory planning and control in this session. We’ll introduce the basics of inventory management, and one of two models we’ll use in this class – the Economic Inventory Quantity and Reorder Point models.
We’ll use the HP DeskJet case to see how these models help make bigger strategic decisions.

The HP DeskJet case allows us to look at the effects of inventory on facility location and supply chain configuration decisions. Hewlett-Packard has several options for improving the performance of its supply chain for DeskJet printers:

(a) The status quo but with different (better) inventory levels  
(b) A new factory in Europe without product redesign  
(c) Product redesign to enable localization in Europe  
(d) A new factory in Europe with product redesign for localization by country

How would you use the data for the European product options shown in Table 1 (included in a spreadsheet on the course website) to estimate the gross benefit of adopting the alternatives (before the offsetting costs of investments in infrastructure or product design). Some of the necessary costs are not included in your case. How would you go about estimating those costs? How important are forecast and inventory record accuracy in each of the alternatives? How do the performance measures and methods for assigning costs at HP affect the various decision-makers’ choices?

**Session 7: March 17th, 9 a.m. – 12 p.m.**  
**Inventory Management: Newsboy Problem**

Case: Sport Obermeyer  
Read: Note on Optimal Ordering Strategies and Supply Chain Coordination

We’ll close our discussion of inventory management by looking at the “newsboy” problem and solution formulation. The newsboy problem is common not only in inventory management, but in other settings as well. The Sport Obermeyer case puts the challenges surfaced in the Beer Game in a real company setting. As you read the case, consider the applicability of the newsboy solution and think about how you would go about answering the following questions:

1. Suppose that all of the production is sourced out of Hong Kong. For the 10 styles shown in Exhibit 10, how much would you order of each parka in the early (pre-trade show) order that must be placed in February?
2. Describe a systematic method to determine appropriate individual product order quantities for the order placed immediately after the Las Vegas trade show.
3. In view of your analysis for the Hong Kong-sourcing scenario, which products would you choose to source out of China? How much of each of these products would you order from China?
4. What operational changes would you recommend to improve performance of Sport Obermeyer’s supply chain?

**Session 8: March 17th, 4:30 – 7:30 p.m.**  
**Supply Chain Management: The Beer Game**
We’ll spend this class session playing a supply chain simulation game – the “beer game.” You will be sufficiently prepared to play the game by virtue of the fact that it is St. Patrick’s Day in NYC!

**Session 9: March 19th, 1 – 4 p.m.**
Management Systems: Toyota Production System

Case: Toyota Motor Manufacturing, U.S.A., Inc

This class turns to lean techniques for managing operations. We’ll briefly review general inventory and production management systems, and then examine the JIT “demand pull” production system. The Toyota case illustrates lean production principles and some of the problems that can arise in such systems. As you are reading the case, consider the following questions:

1. What are the main features of JIT as implemented at Toyota?
2. What is the nature of the problem currently confronting the Georgetown, Kentucky plant? What seem to be the major causes?
3. What would you do to improve the situation?

**Session 10: April 7th, 9 a.m. – 12 p.m.**
Management Systems: Lean Thinking and Class Summary

Case: Lean at Wipro Technologies
Reference: A Just-In-Time Approach to Medical Care

We’ll pull the materials in the course together using the Wipro Technologies case. Wipro Technologies is attempting to implement various lean techniques in a software services company. It has made significant progress, but the leaders of the program wonder if that progress is sufficient, and whether or not tagging the program as “lean” rather than as the development of a new “Wipro Way” is appropriate. They raise a number of questions for you to consider at the end of the case. Recall the reading with which we started the term on “Deep Change.” Is Wipro engaging in “operational innovation?” If not, what should they do to engage in it?

We’ll spend the second half of this session in a review of the materials we have covered throughout the term.