BA 502A/B: Operations & Supply Chain Management

MBA Program
Spring, 2015

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Course Textbooks (required):


Required Materials:
1) Course packet available at U. Bookstore containing the following case study: “University Health Services: Walk-in Clinic” Harvard case #9-681-061
2) Sense of humor

Course Description and Objectives:
This course is concerned with the production or operations function of an organization that is the part of any (public or private, profit or nonprofit) organization that produces goods and/or services. The goals of this course are:

1) to provide a fundamental understanding of basic operations problems and an appreciation of why these problems are such an important part of every organization’s success or failure,
2) to gain a substantive understanding of the trade-offs associated with the implementation of various solutions to these operations problems,
3) to understand how operations in manufacturing and service organizations are closely interrelated and how concepts from one sector can be used to innovate in the other,
4) to understand how quantitative models can be used to gain a better understanding of complex problems and issues faced by operations managers,
5) to understand how production and operations strategies relate to marketing, finance, and other functional areas of a firm, and
6) to learn how operations management plays an integral role in letting organizations match supply and demand.

Throughout the course, we will be using tools and concepts that you have learned (or are presently learning) in other courses in your program, and emphasize the application and integration of concepts from other classes to the material in this course.

**Problem Sets:** There are four problem sets throughout the quarter; problem sets are individual work. Problem sets will be posted on Canvas; **solutions must be submitted by 8:30 am on their due date to receive any credit.** Solutions to the problem sets will be posted on Canvas following their due date.

**Case Studies:** We will analyze three case studies (two will be posted on Canvas and one is available at the UBookstore). **Case studies are a study team exercise.** For each case study, each team should complete a brief written analysis that responds to the study questions that accompany each case; this written analysis must be submitted by 8:30 am on the due date. While each study group should prepare the written analysis, each person is responsible for understanding the issues in the case and everyone should be prepared to contribute to the class discussion.

**Beer Game:** The Beer Game will introduce you to problems associated with managing a decentralized supply chain and to the effects that decisions and information flows along the supply chain have on inventory levels, customer service levels, and costs. We will play the game on Friday, May 29 in class, and discuss the data that you collected during the game in the following class on June 2.

**Class Participation:** Class discussion is an important part of the learning experience in this class. Students are expected to read the assignments before class. If you must miss a class, it is suggested that you try to get any missed notes from a colleague, the instructor, or the TA. Please remember that you are responsible for everything discussed in class (whether in the text or not).

**Incompletes:** Incompletes will only be considered in highly unusual conditions (such as serious illness). Any request for an Incomplete must be stated in writing and submitted before the last day in class. The statement should include a statement of class progress and reasons why the Incomplete is being requested.

**Exams:** There will be two exams. Both exams will be timed eight hour out-of-class exams. Both exams will be comprehensive and open-book, open-notes. No makeup exams will be given for any reason. If you have a (pre-approved) reason for missing the mid-term exam, I will re-weight the final exam (i.e., the final exam will then be worth 40 percent of your final grade).

**Canvas:** I will use Canvas to post announcements, and course materials such as problem sets, powerpoint slides, additional readings, spreadsheet models, etc. You should submit all written assignments (homework, exams, etc) via Canvas. I will post the solutions to problem sets on Canvas following their due date. Please check Canvas on a regular basis as I post notices and updates immediately following each class.
Final Average and Grade: Your course grade will be determined from performance on the case studies, problem sets, exams and class participation. At the end of the course, I will ask you to confidentially rate the other members of your study group (to minimize the free rider problem); I will use these intra-group evaluations to adjust case study scores for individuals. I will also ask you to evaluate your own contribution to the class and use this information when assessing class participation points. Other factors that will contribute to your class participation grade include attendance, punctuality, and the quality and quantity of your comments.

Your final grade will be based on the number of points you earn out of a maximum of 500 points as indicated in the following table.

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<th>Item</th>
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Academic Integrity:
I employ the policies and procedures of the University of Washington Student Conduct Code to maintain academic integrity in the course. The Student Conduct Code affirms that students have the responsibility to practice high standards of academic and professional honesty and integrity and thus prohibits cheating, attempted cheating, plagiarism, and lying to administration or faculty as it pertains to academic work. Suspected violations will be handled in compliance with the University of Washington Student Conduct Code as outlined in Washington Administrative Code 478-120.
Session 1: Friday, April 10

**Topic:** Introduction; Operations strategy in manufacturing & service organizations

**Learning objectives:** We will introduce the concepts of operations management and discuss the importance of operations in both manufacturing and service organizations. Some of the most critical strategic decisions relate to the location of their various facilities (e.g., factories, retail organizations, etc.). We will discuss the nature of these decisions and their implications for an organization’s distribution and production system and illustrate these concepts using models developed in the QMeth class. Finally, we will introduce productivity measures and discuss the implications and importance of these metrics.

**Readings:**
1) Continue reading *The Goal* (Goldratt & Fox)
5) J&C Text: Chapters 1, 2, 15

Session 2: Monday, April 13

**Topics:** Matching supply and demand; Revenue management

**Learning objectives:** The basic focus of operations management is to match supply and demand in order to maximize the expected profitability of the organization. In this session, we will explore the relationship between marketing and operations, including the impact of variable (dynamic) pricing known as revenue management (RM). We will show how RM can increase firms’ expected profits under certain conditions and why it has increased in recent years.

**Readings:**
1) Healy, P. “Ticket Pricing Puts ‘Lion King’ Atop Broadway’s Circle of Life” *New York Times* (March 17, 2014)
2) Aeppel, T. “Seeking Perfect Prices: CEO Tears Up the Rules” WSJ (March 27, 2007)
3) J&C Text: Chapter 5
Session 3: Wednesday, April 15

Topic: Matching supply and demand in global logistics
Introduction to the design of service systems

Learning objectives: We will initially discuss the BOSCO Container Shipping case that combines the concepts of revenue management, location, and logistics that we discussed in the previous class (as well as the QMeth course). Following this case discussion, we will introduce the topic of service system design, define and characterize various types of service structures, and discuss arrival patterns and service times.

2) Pawlowski, A. “Queuing psychology: Can waiting in line be fun?” CNN (Nov 20, 2008)
3) Kessler, A. “Don’t Tread on Me—or Make Me Stand in Line” WSJ (Feb 18, 2014)
4) Stone, Alex "Why Waiting is Torture" New York Times (Aug 18, 2012)
5) J&C Text: Chapter 9

Case Due: BOSCO Container Shipping, Ltd. case study (available on Canvas)

Session 4: Wednesday, April 22

Topic: The psychology and science of waiting lines

Learning objectives: We will continue our discussion on service systems. We will discuss the implications of using waiting times to vary price and demand. We will define several queuing models that illustrate some of the basic implications of managing facilities when demand and service times are random.

Readings: 1) J&C Text: Chapter 10 (Waiting Line Analysis)
2) Steinmetz, K. "Park that thing..." Time (Feb 23-March 2, 2015), p 20
3) Larson, R. “Perspectives on queues: social justice and the psychology of queuing” Operations Research (Nov-Dec, 1987)
Session 5: Monday, April 27

Topic: Service systems continued: Balancing costs and benefits

Learning objectives: Waiting lines impose a cost on consumers; in this session, we will explore the trade-offs between shorter lines (and lower waiting costs) and higher prices for goods and/or services. We will discuss these trade-offs in the context of the facility you observed and the data that you collected in the “Service System Observation” exercise.

2) Gasparro, A. “Restaurant chains feel the need for speed” WSJ, Aug 29, 2012

Study Group Exercise Due: Service Facility Observation and Analysis

Session 6: Thursday, April 30

Topic: Process analysis: lean operations; sustainability; Toyota production system

Learning objectives: Initially, we will discuss the University Health Services Walk-in Clinic case that illustrates a number of basic issues relating to the management of service facilities. Specifically, this case deals with trade-offs faced by the manager of the walk-in clinic at Harvard University who wants to offer high quality service while controlling the costs of the clinic.

In the second half of this class, we will discuss lean production as it is defined by the Toyota production system and show how these concepts from a factory have been applied to service and health operations. We will also discuss concepts of Just-in-Time (JIT), push versus pull systems, kanban, etc. and how they relate to manufacturing and service systems.

Reading: 1) J&C Text: Chapter 23
3) Wysocki, B. “To Fix Health Care, Hospitals Take Tips From Factory Floor” WSJ (April 9, 2004)

Case Due: University Health Services Walk-in Clinic (in course packet at UBookstore)
Session 7: Monday, May 4

**Topic:** The Theory of Constraints (TOC) and Bottleneck Analysis; Review for Mid-Term Exam

**Learning objectives:** We will discuss Goldratt’s theory of constraints as Alex Rogo and colleagues discover them while managing the Bearington plant in the novel, *The Goal.* This classic book introduces many fundamental concepts, including the importance of identifying bottlenecks to maximize throughput and the management of inventories to minimize operating costs.

**Readings:** 1) J&C Text: Chapter 14  

**Assignment Due:** Problem Set #1

Wednesday, May 6: Mid-Quarter Exam *(8 hour timed out-of-class exam)*

Session 8: Wednesday, May 13

**Topic:** Process control and quality management

**Learning objectives:** How do you design any system to minimize the number of defects produced? How do you trade-off the costs of managing and maintaining systems with very low defect rates versus the costs of imposing defective items on consumers (and thereby incurring higher warranty and/or repair costs)? We introduce and explore these trade-offs in this class.

**Readings:** 1) J&C Text: Chapter 13  
2) Kalb, C. “Do no harm: Medical errors kill some 100,000 Americans every year. How can we reverse the trend?” *Newsweek* (Sept. 27, 2010)  
Session 9: Friday, May 15  
**Topic:** Total quality control; sampling; control charts; six sigma; ISO standards  

**Learning objectives:** An important part of any system is determining when the operations have shifted from a state of “common cause variation” (that is, normal daily variation) to a state of “special cause variation”. In this class, we will show how statistical control charts can be used to judge if a process has shifted to an out-of-control state and needs to be re-adjusted and/or reset. In addition, we will discuss the six sigma system as implemented by Motorola, Ford, and other companies, and compare the six sigma approach with more traditional quality management systems. We will also discuss ISO standards and their implications for environmental, quality, and sustainability.

**Readings:**  
1) J&C Text: Chapter 12  

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Session 10: Tuesday, May 19  
**Topic:** Inventory systems (continuous review and periodic review); EOQ model  

**Learning objectives:** Inventory is one of the most costly elements in many operations. In this class, we will introduce the components that define inventory costs and define a typical continuous review inventory system. We will define the classic Economic Order Quantity (EOQ) model that illustrates the trade-offs in continuous review systems when demand is known and constant.

**Reading:**  
1) J&C Text: Chapter 20  
3) Singh, S. “Low Inventory Angers John Deere Customers” *Bloomberg Businessweek* (April 22, 2010)

**Assignment Due:** Problem Set #2

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Session 11: Thursday, May 21  
**Topic:** Periodic review inventory systems  

**Learning objectives:** In this class, we will define periodic review systems and compare them to continuous review systems. We will introduce inventory systems when demand is random and show how increased variation in consumer demand increases inventory costs.

**Reading:**  
2) Aeppel, T. “For Lean Factories, No Buffer” *WSJ* (April 29, 2011)
Session 12: Tuesday, May 26

Topic: Newsvendor problem and applications

Learning objectives: We will discuss inventory systems when a single ordering decision must be made (e.g., the case for ordering newspapers at the beginning of a day or Seahawk gear prior to the Super Bowl). We will show how this model can be applied to a wide variety of situations, including the revenue management case discussed earlier in the course.

Reading:  Wang, D. “Stocking for Success: Merchandisers Prepare for Super Bowl Win”  
KUOW News and Information (Jan 31, 2014)

Assignment Due: Problem Set #3

Session 13: Wednesday, May 27

Topic: Decentralized supply chains and the “Double Marginalization” effect; Contracts to coordinate supply chains; Bullwhip effect defined; Beer Game instructions

Learning objectives: We will discuss and compare decentralized and centralized supply chains and show why centralized supply chains are always more efficient. We will discuss various types of contracts that are used to coordinate decentralized supply chains and illustrate their use by means of a series of spreadsheet example problems. Finally, we will introduce the so-called “bullwhip” effect and review the Beer Game instructions that we will play on May 29.

Readings:  1) “Herd Instinct” The Economist (Jan 19, 2013)  
3) Beer Game Instructions/Manual

Assignment Due: Problem Set #4
Session 14: Friday, May 29

**Topic:** Beer Game

**Learning objectives:** Explore the elements of operating a decentralized supply chain when communication among stakeholders is limited. Explore how a bullwhip effect occurs and how it impacts costs in a decentralized supply chain.

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Session 15: Tuesday, June 2

**Topic:** Beer game and bullwhip effect; Supply chain management review

**Learning objectives:** We will continue our discussion on the bullwhip effect, including its presence in the Beer Game, and ways to eliminate the bullwhip effect from decentralized supply chains. We will discuss the SCM case study that illustrates many of the concepts discussed in previous classes.

**Readings:**
2) “The cost of calamity” *The Economist* (March 17, 2011)

**Case Due:** SCM case study *(on Canvas)*

**Assignment Due:** Beer Game spreadsheets (with data collected during game)

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**Thursday, June 4: Final Exam** *(8 hour timed out-of-class exam)*