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Course Description

How do organizations such as financial institutions, health care, and manufacturing meet customer needs and stay consistent with their goals and values? How do organizations make trade-off decisions with respect to quality, cost, and time? Operations Management provides tools and methods to answer these questions optimally in a global business world.

Operations managers are primarily concerned with the design, procurement, production, and delivery of goods and services. They are responsible for the systematic planning, designing, operating, controlling and improving the various procurement, production, storage, and shipping processes involved from the time the product or service is designed till customer delivery occurs. The challenge for operations managers is to produce goods and services and deliver them in an efficient manner and in accordance with the business strategy of their company. Typically, this involves balancing the needs for satisfying customer demand, on-time delivery, lower costs, and higher quality.

Course Learning Goal

In this course, you will learn the fundamentals of Operations Management, enhance your managerial insight and intuition, and improve your business decisions.

The main focus of this course is on the Marshall Undergraduate Learning Goals (see last page of the syllabus for a complete description) of “understanding key business areas” and “developing critical thinking skills”, while also supporting the goal of “being effective communicators”. In this course students will:

- Understand the spectrum of operations management activities in the business and to the types of decisions made by operations managers
- Make sound business decisions by assessing the basic trade-offs associated with operations management decisions
- Practice their learned proficiencies using a variety of tools and techniques in the following areas enabling the business to compete effectively in the marketplace
 - ♦ Process Analysis and Capacity Management.
 - ♦ Waiting Line Management.
 - ♦ Optimization and Linear Programming.
 - ♦ Revenue Management.
 - ♦ Inventory and Supply Chain Management.
- Predicting, anticipating, and taking into account how operations management interfaces with other functional areas such as strategy, accounting, finance, human resources, and marketing
- Develop critical thinking skills to assess tradeoffs in process design, capacity allocation, inventory levels, and customer service
- Apply critical thinking and problem-solving skills in the context of managing a lab (an experiential learning simulation), and make real-time decisions on capacity, quoted lead-times, work-in-process levels, contracts and inventory.
- Make operational decisions taking into account the global nature of supply chains (an experiential learning simulation), the interplay between levels of the supply chain and their locations, and implications for pricing, competition and customer service
- Apply operations management tools/techniques to analyze an outpatient clinic of a health center characterized by ambiguity and/or uncertainty, and create and defend well-reasoned conclusions and solutions
- Apply optimization tools/techniques including formulating a linear program, and solving it in Excel Solver to determine the optimal product-mix for an agri-business

Required Materials

- *BUAD 311 Operations Management* (ISBN13: 978-0-697-79527-4, ISBN10: 0-697-79527-6), custom-made textbook available at the bookstore. The textbook can also be purchased at <https://create.mcgraw-hill.com/shop/#/catalog/details/?isbn=9781121107915>
Note: eBook has a different ISBN number 978-1-121-10791-5.
- *The Goal*, Goldratt and Cox, 3rd edition, North River Press.
- Other required readings are available via USC Libraries' Automated Reserve System (ARES)¹.

Prerequisites and/or Recommended Preparation:

Co-requisite: BUAD 310

Course Notes:

Each instructor will have his/her own Blackboard site. Please check the Blackboard site and your email daily for class preparation materials or instructions. Lecture notes/slides will be posted on Blackboard. If you would like hard copies of them, it will be your responsibility to print them out.

¹ <https://reserves.usc.edu>

ASSIGNMENTS AND GRADING DETAIL

The course grade, which will be curved, is based on two midterms, a cumulative final exam, in-class quizzes (there will be three quizzes, but only the best two will count towards the course grade), homework (there will be three homework assignments, but only the best two will count towards the course grade), performance on Littlefield Simulations, and class participation according to the following weights:

Participation	7.5%
Quizzes	7.5%
Homework	7.5%
The Goal	2.5%
Littlefield Simulations	10%
Exam 1	20%
Exam 2	20%
Final Exam	25%

The weights listed above will be used to come up with your overall score for the class. Final grades represent how you perform in the class relative to other students. Your grade will not be based on a mandated target, but on your performance. Historically, the average grade for this class is around a “B”. Your grade will be based on your overall score for the course, as well as your ranking among the students in the section(s) taught by your instructor.

Class Attendance & Participation:

It is critical for each student to actively participate in the class discussion. Read the assigned material before the class and make sure you are familiar with the main issues to be discussed in class. Your participation is evaluated mainly on the quality of your contribution and insights. You will be asked to find an example of an operations problem you see in your daily life (for example, from reading the newspaper or from your experience). Alternatively, some instructors may award participation credit for a one-page write-up answering discussion questions on the Kristen’s Cookies case and Zara case, and participation in the West Coast University Hospital and Blue Ribbon Foods cases.

Students must complete the assigned readings and homework assignments prior to coming to class. **Some instructors accept homework assignments only via Blackboard; other instructors may only accept homework assignments in class. Please check with your instructor. Late submissions will not be accepted.**

Case Analysis:

During the course, we will analyze several case studies. All cases will be analyzed and discussed in class. Two of the cases, the West Coast University Student Health Services: Primary Care Clinic and Blue Ribbon Foods, will be analyzed in teams (in class). Each team will consist of up to 5 students.

Littlefield Simulation:

Littlefield Labs is a competitive web-based lab simulation (<http://www.responsive.net>). It consists of two assignments, each lasting seven days. In each assignment, the student teams will compete to make the most money by managing a lab. The first simulation game focuses on capacity

management in an environment with growing demand. The second simulation game focuses on lead time and inventory management.

Every student must purchase a Littlefield Labs Access Code from the bookstore or directly from the vendor (<http://mgr.responsive.net/Manager/ShowClient>) and register the teams before Session 10. Each team should have 5 or less students. In addition to the Access Code, you need the following course code to register: **usc**.

eBeer Game:

To understand the significance issues in supply chains, we play eBeer the Game. The license fee is covered in the Littlefield purchase. Each student must register by Session 23 using course code: usc.

Quizzes and Exams:

All exams/quizzes are closed books. You are allowed to use one double-sided crib sheet (8.5x11) on each quiz/exam. **No make-up exams or quizzes are offered** – accordingly, all quizzes must be taken on their assigned date and in the section in which students are registered. Students are not allowed to attend other sections – and attendance will be called randomly throughout the semester. **You will receive a grade of zero for each missed quiz/exam** unless you have a written excuse from your doctor or the University.

The final examination will take place on **Friday, December 12 from 8:00—10:00 AM**. The final exam is comprehensive, but greater emphasis will be given to the material taught later in the semester. You **cannot** be exempted from this final under any circumstances. **The final exam will not be given at any other time.** According to the USC Office of Academic Records and Registrar, *“No student in a course with a final examination is permitted to omit the final examination or take the final examination prior to its scheduled date, and no instructor is authorized to permit a student to do so. No student is allowed to re-take a final examination or do extra work in a course after the semester has ended for purposes of improving his or her grade.”*

Working Together:

Discussion of homework problems is permitted and encouraged; however, each student is required to prepare and submit his or her solutions, including computer work, independently.

Collaboration of any sort on quizzes and exams is prohibited and will result in a zero on that quiz/exam. Instructors reserve the right to bring any potential cheating issues to the administration for further penalties.

MARSHALL GUIDELINES

Add/Drop Process

BUAD 311 will remain in open enrollment (R-clearance) for the first three weeks of the term. If there is an open seat, students will be freely able to add a class using Web Registration throughout the first three weeks of the term. If the class is full, students will need to continue checking Web Registration to see if a seat becomes available. There are no wait lists for these courses, and professors cannot add students. An instructor may drop any student who, without prior consent, does not attend the first two sessions; the instructor is not required to notify the student that s/he is being dropped. If you are absent six or more times prior to *September 12* (the last day to withdraw from a course without a grade of “W”), your instructor may ask you to withdraw from the class by that date. These policies maintain professionalism and ensure a system that is fair to all students.

Statement for Students with Disabilities

Any student requesting academic accommodations based on disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776. For more information visit www.usc.edu/disability.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, (www.usc.edu/scampus or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>. Failure to adhere to the academic conduct standards set forth by these guidelines and our programs will not be tolerated by the USC Marshall community and can lead to dismissal.

Class Notes Policy

Notes or recordings made by students based on a university class or lecture may only be made for purposes of individual or group study, or for other non-commercial purposes that reasonably arise from the student's membership in the class or attendance at the university. This restriction also applies to any information distributed, disseminated or in any way displayed for use in relationship to the class, whether obtained in class, via email or otherwise on the Internet or via any other medium. Actions in violation of this policy constitute a violation of the Student Conduct Code, and may subject an individual or entity to university discipline and/or legal proceedings.

Emergency Preparedness/Course Continuity

In the case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

Please activate your course in Blackboard with access to the course syllabus. Whether or not you use Blackboard regularly, these preparations will be crucial in an emergency. USC's Blackboard learning management system and support information are available at blackboard.usc.edu.

COURSE CALENDAR

<u>Session</u>	<u>Date</u>	<u>Topics</u>	<u>Assignments due</u>
1	M 8/25 & T 8/26	Course introduction and overview	
2	W 8/27 & Th 8/28	Metrics: Capacity, Time, WIP	
M 9/1 Labor Day Holiday			
3	T 9/2 & W 9/3	Kristen's Cookies case (in text Appendix B)	1-page write-up due
4	Th 9/4 & M 9/8	More on Capacity/Flexibility	
5	T 9/9 & W 9/10	Little's Law; Intro to Probability	
6	Th 9/11 & M 9/15	Intro to Waiting Lines	HW 1 due: Process Analysis
7	T 9/16 & W 9/17	Waiting Line Metrics	Quiz 1: Process Analysis
8	Th 9/18 & M 9/22	"West Coast University Student Health Services: Primary Care Clinic" (in textbook Appendix C)	
9	T 9/23 & W 9/24	The Goal	2-page paper due
10	Th 9/25 & M 9/29	Midterm 1 Review	Deadline for Littlefield simulations code purchase and team registration
11	T 9/30 & W 10/1	Midterm 1	
12	Th 10/2 & M 10/6	Intro to Linear Programming	Th 10/2—8 pm: Littlefield-1 observation period begins
13	T 10/7 & W 10/8	Practical Linear Programs	
14	Th 10/9 & M 10/13	Integer Programming	Th 10/9—8 pm: Littlefield-1 Begins
15	T 10/14 & W 10/15	"Blue Ribbon Foods" case (to be posted on BB)	
16	Th 10/16 & M 10/20	Intro to RM: Decision Trees	Quiz #2: Linear Programming Th 10/16—8 pm: Littlefield-1 Ends
17	T 10/21 & W 10/22	RM: Capacity Control	
18	Th 10/23 & M 10/27	RM: More Capacity Control and Overbooking	Littlefield-1 Team Reports due
19	T 10/28 & W 10/29	Guest Speaker	
20	Th 10/30 & M 11/3	Midterm 2 Review	HW #2: Revenue Management

21	T 11/4 & W 11/5	Midterm 2	
22	Th 11/6 & M 11/10	Intro to Inventory Management; the EOQ model	Th 11/6—8 pm: Littlefield-2 observation period begins
23	T 11/11 & W 11/12	Demand Uncertainty and the Newsvendor Model	Deadline for students to register (individually) for eBeer game
24	Th 11/13 & M 11/17	Inventory Systems	Quiz 3: EOQ and Newsvendor Th 11/13—8 pm: Littlefield-2 Begins
25	T 11/18 & W 11/19	Intro to Forecasting	
26	Th 11/20 & M 11/24	Supply Chain Dynamics & the eBeer Game	Th 11/20—8 pm: Littlefield-2 Ends
T 11/25: No Class; W 11/26 & Th 11/27 Thanksgiving Day Holiday: No Class			
27	M 12/1 & T 12/2	Zara	HW #3 due: Inventory Management 1-page write-up due
28	W 12/3 & Th 12/4	Final Review	Littlefield-2 Team Reports due
Final Exam	Friday 12/12 8 am – 10 am		

COURSE OUTLINE/READINGS/CLASS SESSIONS

Module 1: Process Analysis and Capacity Management

Session 1 – 8/25/14 (Monday) / 8/26/14 (Tuesday): Introduction to Operations Management and Process Analysis

Question: What is Operations Management? Why Operations Management?

Learning Outcomes: The purpose of this lesson is to introduce Operations Management (OM) to you. You and your classmates will discover that OM is everywhere and that a study in OM prepares you to make sound business decisions by assessing trade-offs and identifying improvement opportunities.

- Define and recognize Operations Management in real-world situations
- Construct and read business processes using flow chart diagrams
- Understand the potential trade-offs in make-to-stock and make-to-order processes
- Become acquainted with Operations Management's philosophy to decision making

Text Reading: Chapter 1: pp. 1-7, Chapter 2: pp. 23-29

Session 2 – 8/27/14 (Wednesday) / 8/28/14(Thursday): Measures: Capacity, Time, and More

Question: How do we quantify the performance of a process?

Learning Outcomes: The flow of customers or products into and out of a system determines process efficiency and ultimately the bottom line.

- Define capacity, flow rate, and utilization rate
- Define flow time and work-in-process
- Understand that a bottleneck governs the process capacity

Text Reading: Chapter 2: pp. 29-35

ARES Reading: "Changing Ahead to Push Electric Cars" Los Angeles Times, December 27, 2008

"Latest Starbucks Buzzword: 'Lean' Japanese Techniques" Wall Street Journal, August 1, 2009

Teaching Note: Process Analysis

Session 3 – 9/2/14 (Tuesday) / 9/3/14 (Wednesday) The Kristen's Cookie Company (Textbook Appendix B), More on Capacity Management

Question: What is the makeup of a small cookie business? How do we determine capacity requirements?

Learning Outcomes: Through this case, you will gain a better understanding of the business profitability through business process analysis, evaluate key performance measures under different sales mix, and recognize the impact of the bottleneck on the bottom line. After the case, we will examine factors that determine the business's capacity planning.

- Learn the fundamental capacity requirement calculation
- Understand the impact of variability/seasonality on capacity requirement
- Understand the impact of inventory on capacity requirement

Case preparation questions can be found at the end of the case.

Text Reading: Appendix B

ARES Reading: "1-888-WOW-1DAY!" Inc, May 2012

You will earn participation points by submitting your analyses (1 page, spacing 1.5 lines). Due for some instructors--by 6:00pm the previous day; other instructors—in class; check with your instructor.

Session 4 – 9/4/14 (Thursday) / 9/8/14 (Monday): More on Capacity; Flexibility

Question: How do you calculate capacity in different situations? What is the effect of flexible resources on capacity?

Learning Outcomes: Through several examples of interesting processes, we will solidify our understanding of calculating metrics such as capacity.

- Learn about coffee processing operations at Colruyt, a Belgian grocery chain
- Learn how to calculate metrics when there are multiple products, setup, yield losses, and multiple batch sizes
- Understand the impact of flexible resources on capacity

Text Reading: Chapter 1: pp. 35-41

ARES Reading: “Taco Bell and the Golden Age of Drive-Thru” Businessweek, May 5, 2011

Session 5- 9/9/14 (Tuesday) / 9/10/14 (Wednesday): Little’s Law

Question: What is Little’s Law? How can we use the formula to better understand the performance of the business processes?

Learning Outcomes: There is a significant relationship among key performance indicators of a process. You will learn the powerful formula to help you better understand the performance of the business processes.

- Evaluate process performance using Little’s Law
- Understand how versatile the formula is

We will also reacquaint ourselves with probability and statistical concepts before we move on to Module 2.

- Refresh your understanding of concepts such as random variable and distribution
- Reacquaint yourself with the language of probability and statistics (expectation, variance, variability)
- Review and practice basic formulas and common distribution functions that are widely used

Text Reading: Chapter 1: pp. 7-10

Teaching Note: Variability and Queues

Module 2: Waiting Line Management

Session 6 – 9/11/14 (Thursday) / 9/15/14 (Monday): Waiting Lines: Understanding Rules and Principles

Question: How is waiting experienced as a psychological phenomenon? What rules and non-formulaic principles can support us in understanding and managing wait lines or queues to optimize performance and revenues?

Learning Outcomes: We wait. Understanding *waiting* as a phenomenon and *queuing* as theory and process enables us to create schedules, monitor inventory, analyze service, and determine a cost-effective balance for optimal performance and revenues. In this class, you will build a core understanding of three important factors pertaining to the performance of the waiting lines.

- Recognize the psychology of waiting-lines
- Understand variability and its impact on the waiting performance
- Review utilization rate and its effect on waiting performance
- Identify the risk pooling effect in the waiting line systems

Text Reading: Chapter 3: pp. 47-60

ARES Reading: “The Psychology of Waiting-lines” David H. Maister

“A Long Line for a Shorter Wait at the Supermarket” New York Times, June 23, 2007

Due HW # 1: Process Analysis and Capacity Management

Session 7 – 9/16/14 (Tuesday) / 9/17/14 (Wednesday): Waiting Lines: Waiting Line Classifications and Formulas

Question: What are the important factors that can help us quantify the waiting time? How can mathematical calculations support our decision-making for optimal performance and revenues?

Learning Outcomes: We wait. What does waiting look like when we translate real life into variables for use in formulas and mathematical calculations to determine expected waiting time?

- Identify classifications for different kinds of waiting systems
- Present formulas for various waiting systems to quantify waiting time
- Practice solving for average waiting time using formulas
- Reexamine waiting lines principles using formulas and spreadsheet macro

Text Reading: Chapter 3: pp. 60-80

ARES Reading: “Cracking the Code at Disneyland” Wall Street Journal, December 23, 2004

Quiz # 1: Process Analysis, Capacity Management, and Little’s Law

Session 8 – /9/18/14 (Thursday) / 9/22/14 (Monday): West Coast University Student Health Services: Primary Care Clinic (Textbook Appendix C)

Question: With a given number of physicians, how can we best serve patients most efficiently and with minimal wait time? How do we leverage the risk pooling effect?

Learning Outcomes: Putting theory and skills to practice, we will engage with a real-life case to deepen our understanding of capacity management. You will need to sort through extensive case information, assess tradeoffs in process design and capacity allocation, and apply concepts of risk pooling, variability, and capacity utilization.

Case preparation questions:

1. *In Joan Carvin’s mind what are main problems that the Health services are facing? Do you agree with Joan? Explain your answer in detail.*
2. *What are the potential solutions to the problems? How the flow chart of Joan Carvin’s solution would differ from the current scheme and explain the advantages and disadvantages of the proposed solution.*
3. *How would you measure the success of a solution? What are the measures you would use? Explain your answer.*
4. *Assuming the solution suggested by Dr. Carvin, how would you construct the teams? How many Physicians and How many NP should be in each team? In your analysis, you may assume that all physician and NP are preferred, more or less, by the same number of students. Also, in your analysis, you may make any reasonable assumptions. You must state these assumptions very clearly.*

If you have a solution that is different from Dr. Carvin’s solution then explain the advantages of your solution. Support your analysis by facts and analysis.

Text Reading: Appendix C

Note: The caption for Exhibit 8 should read “Number of Patients Arriving at the Walk-in Clinic” instead of “Summary of Arrival and Waiting Times” and “Average Patient Arrival Times for Walk-in Clinic”

Session 9 – 9/23/14 (Tuesday) / 9/24/14 (Wednesday): “The Goal”

Question: What is “the Goal” of a firm? How a company can achieve its goal using the Operations Management’s philosophy?

Learning Outcomes: The book “The Goal” provides a nice description of the process flows, accounting measures, bottleneck management, and the concepts of Theory of Constraints and continuous improvement.

- Key financial measures identified in the book
- How financial measures are related to operations measures like inventories and throughput rate
- Revisit bottlenecks
- Philosophy/approach to Theory of Constraints and continuous improvement

Text Readings: *The Goal*

You will earn participation points by submitting your individual analyses (assignment questions to be posted on Blackboard). Due either at 6 pm the previous day or at the beginning of class; Check with your instructor (2 pages, 1.5 lines spacing)

Session 10 – /9/25/14 (Thursday) / 9/29/14 (Monday): Exam #1 Review

Due: Littlefield Game code needs to be purchased, and teams need to be registered by this date

Session 11 – 9/30/14 (Tuesday) / 10/1/14 (Wednesday): Exam #1

Module 3: Optimization and Linear Programming

Session 12 – 10/2/14 (Thursday) / 10/6/14 (Monday): Introduction to Linear Programming

Question: How do we find the optimal solution? What is a linear program? How can we use Excel to solve a linear program?

Learning Outcomes: Optimization gives business a critical edge. In this class, you will learn that optimization is a powerful tool that can be applied to various business problems not limited to operations management. You will be able to formulate a linear program (LP) and solve small LP problems using Excel Solver.

- Recognize linear program as a special optimization tool
- Understand the components of a linear program
- Formulate linear programs and solve it using Excel solver
- Make decisions by utilizing optimization tools to allocate resources effectively

Text Reading: Chapter 5: pp. 113-122.

ARES Reading: “Did You Hear the One About the Salesman Who Traveled Better?” Wall Street Journal, April 23, 2004

Teaching Note: Linear Programming

Observation period for the first Littlefield Game starts at 8:00 pm, Thursday 10/2/14

Session 13 – 10/7/14 (Tuesday) / 10/8/14 (Wednesday): Practical Linear Programs

Question: Can we use the LP techniques to solve real business problems? What are the typical business problems where LP techniques can be applied? How can we interpret sensitivity analysis reports?

Learning Outcomes: You will practice more advanced linear program formulation in Excel. You will appreciate the value of the Excel reports, which help you understand how the solutions change if the conditions vary.

- Solve linear programs using Solver
- Understand the impact of flexibility on capacity requirement
- Interpret Excel reports for business insights

Session 14 – 10/9/14 (Thursday) / 10/13/14 (Monday): Introduction to Integer Programming

Question: Can we apply optimization tools when the decision variables are not divisible?

Learning Outcomes: Optimization is more than linear programming. The firms cannot hire half of a person or fly a quarter of an airplane. You will be able to formulate an integer program (IP) and solve small IP problems using Excel Solver.

- Understand the components of an integer program
- Formulate integer programs and solve it using Excel solver
- Create a model for locating earthquake shelters in the San Gabriel Valley using IP

Reading (case): “Locating Earthquake Shelters in the San Gabriel Valley.” (To be posted on Blackboard)

ARES Reading: “Coke has a Secret Formula for Orange Juice, Too” Businessweek, January 31, 2013.

First Littlefield Game Starts at 8:00 pm, Thursday 10/9/2014

Session 15 – 10/14/14 (Tuesday) / 10/15/14 (Wednesday): Blue Ribbon Foods (Case will be posted in Blackboard)

Question: How can we build a successful model to solve real-world resource allocation problems? What is the “optimal” product mix?

Learning Outcomes: In this case, you will transform a business challenge into a mathematical model with your choice of decision variables and objective function. Not only you will build a model, but you will also interpret your conclusions.

Case preparation questions can be found at the end of the case.

Due Blue Ribbon Foods team case analyses (6:00 pm previous day or in class; check with your instructor)

Module 4: Revenue Management

Session 16 – 10/16/14 (Thursday) / 10/20/14 (Monday): Introduction to Revenue Management and Decision Trees

Question: How can we optimize our decision in an uncertain world? What is a Decision Tree? How can it be used as a tool to manage and increase revenue?

Learning Outcomes: The Decision Tree is a schematic model used to manage uncertainty by clearly identifying choices and alternative choices. You will learn how to construct a decision tree -- i.e., its nodes and branches and solve the optimal decision by studying a capacity investment problem.

- Learn to draw a decision tree and distinguish the two types of the nodes
- Practice solving decision trees
- Appreciate the value of delaying decisions to collect information

ARES Reading: “Saints’ Risky Decisions were Both Calculated and Crucial” New York Times, February 9, 2010

Quiz #2: Linear Programming

First Littlefield Game Ends at 8:00 pm, Thursday 10/16/14

Session 17 – 10/21/14 (Tuesday) / 10/22/14 (Wednesday): Revenue Management Tools

Question: How many classes should the airline offer? What price should an airline charge to increase revenue? Moreover, how many seats should an airline sell for each class?

Learning Outcomes: You’ve purchased airline tickets and experience variability in ticket prices. You’ve probably also been offered a greater sum of money and additional awards to buy-back your ticket at the gate for overbooked flights. In this lesson, we will learn tools to control capacity and maximize revenues.

- Appreciate the history of revenue management as “invented” by airline carriers after deregulation
- Become acquainted with the revenue management tools: pricing, marketing segmentation, capacity control
- Identify the elements and trade-offs of basic revenue management
- Utilize a decision tree to solve for these types of problems

ARES Reading: “You Paid What for That Flight?” Wall Street Journal, August 26, 2010

Session 18 – 10/23/14 (Thursday) / 10/27/14 (Monday): More Capacity Control and Overbooking

Question: How many seats should an airline reserve for discount travelers? How many for business travelers? Moreover, by how many seats should an airline overbook on a flight?

Learning Outcomes: You will learn the elements of capacity control under different demand distributions.

- ♦ Learn how to calculate the “booking limit”, i.e., the number of seats allocated to discount customers

- ♦ Learn how to calculate the optimal number of seats to overbook on a flight.

ARES Reading: “Airlines, Masters of Overbooking, Are Bumping Less” New York Times, April 6, 2010

Due: First Littlefield Game Report

Session 19 – 10/28/14 (Tuesday) / 10/29/14 (Wednesday): Guest Lecture

Question: What are the operations management challenges faced by practitioners? What are their daily tasks?

Learning Outcomes: In this class, operation practitioners will expose you to the challenges and tasks they face. The competitiveness of a company is determined by their multi-year planning and daily execution.

Session 20 – 10/30/14 (Thursday) / 11/3/14 (Monday): Exam # 2 Review

Due HW #2: Revenue Management

Session 21 – 11/4/14 (Tuesday) / 11/5/14 (Wednesday): Exam # 2

Module 5: Inventory Management and Supply Chain Coordination

Session 22 – 11/6/14 (Thursday) / 11/10/14 (Monday): Economies of Scale

Question: Why carry inventories? What is “economies of scale”? How can we minimize costs?

Learning Outcomes: Inventory is essential for business activities though it can be costly. You will examine the trade-offs between economies of scale and inventory cost and learn how to find the right amount of inventory using the economic order quantity (EOQ) formula.

- Identify the different purposes for keeping inventory
- Define inventory turn, the key performance measure
- Discuss the phenomena of economies of scale and trade-offs of a basic inventory problem
- Practice using the EOQ formula to minimize cost

Text Readings: Chapter 7: 185-193, 197-200, 208-210

Observation period for the Second Littlefield Game starts at 8:00 pm, Monday 11/6/14

Session 23 – 11/11/14 (Tuesday) / 11/12/14 (Wednesday): Demand Uncertainty

Question: Why carry inventories? How to guarantee customer satisfaction with minimum inventory?

Learning Outcomes: Inventory is a necessary evil especially when you face demand uncertainty. You will learn a reasoning method called marginal analysis. You will examine the trade-offs between more and less inventories and solve the problem optimally via a decision tree.

- Identify the elements and trade-offs of a basic inventory problem
- Practice marginal analysis and optimize decision making using a decision tree
- Examine the risk pooling effect in inventory systems

Text Readings: Chapter 7: pp. 193-196

ARES Reading: “The Web as a Store Windows” New York Times, August 24, 2010

Teaching Note: Inventory Management

Session 24 – 11/13/14 (Thursday) / 11/17/14 (Monday): Putting Together: Economies of Scale & Demand Uncertainty

Question: What does the real life inventory policy look like? When and how many should we reorder?

Learning Outcomes: Various real life inventory systems are presented. The optimal policy is built on the same trade-offs you learned in the previous classes. Today's class will also help you play the simulation game.

- Learn different kinds of inventory systems
- Understand the concept of lead-time and safety stock
- Identify the trade-offs in a real-life inventory system

Text Readings: Chapter 7: pp. 196-197, 201-208

Quiz #3: EOQ and newsvendor

Due: eBeer Game (individual) Registration

Second Littlefield Game Starts at 8:00 pm, Thursday 11/13/14

Session 25 11/18/14 (Tuesday) / 11/19/14 (Wednesday): Introduction to Forecasting

Question: How do we obtain demand forecasts? What makes a good forecast?

Learning Outcomes: Anticipating the future is no easy task. From astrologers to business managers, we try as best we can to use science and mathematics to demystify the unknown for optimal decision-making. Finance, marketing, as well as production and service, rely on forecasting to make both long-term and short-term management decisions. You will learn the methods basic to forecasting, become skilled at calculating measurement error, and understand the trade-offs between responsiveness and stability in parametric selection.

- Define basic concepts of forecasting
- Understand how to measure forecast error of a forecast method
- Apply the simple moving average model and the exponential smoothing method
- Understand the trend and seasonality components of the forecast

Text Readings: Chapter 6: pp. 135-140, 152-160

ARES Reading: "Stopping Crime Before It Starts" Los Angeles Times, August 21, 2010

Session 26 – 11/20/14 (Thursday) / 11/24/14 (Monday): Supply Chain Dynamics and Root Beer Game

Question: What is the "bull-whip" effect? How do our decisions influence others' decision?

Learning Outcomes: The success of a company relies on its upstream supplier and downstream distribution partners. Incentive and information are two crucial factors in decision making. You will play the beer game to demonstrate the information distortion in a supply chain.

- Experience the bull-whip effect via the beer game
- Learn how to combat the bull-whip effect.

Text Readings: Chapter 8: pp. 231-238

ARES Readings: "Clarity is Missing Link in Supply Chain" Wall Street Journal, May 18, 2009

Second Littlefield Game Ends at 8:00pm, Thursday 11/20/14

Session 27 – 12/1/14 (Monday) / 12/2/14 (Tuesday): Zara Case Study (Case will be posted on Blackboard)

Question: Have you been to a Zara store? How does Zara manage its inventory and supply chain?

Learning Outcomes: The fashion business is demanding on inventory management because leftovers get significant markdowns. You will study Zara's supply chain structure and its inventory policy and examine how its operation strategy aligns with its business strategy.

Case preparation questions:

1. What makes Zara different from other specialty apparel retailers?
2. Where are competitive threats to Zara likely to come from?
3. What should Zara's approach be to determining its sourcing mix? What factual assumptions are you making when you reach your conclusions?

4. *How sustainable would you calibrate Zara's competitive advantage as being relative to the kinds of advantages typically pursued by other retailers?*

ARES Reading: "Zara Grows as Retail Rivals Struggle" Wall Street Journal, March 26, 2009

"Zara Wakes Up to the Web" Wall Street Journal, August 26, 2010

"As Rivals Outsource, Lenovo Keeps Production In-House" Wall Street Journal, July 9, 2012

If you have not submitted one-page write-up on an exciting OM issue you found in a newspaper/magazine or TV show by now, you will earn participation points by submitting your analyses (1 page, spacing 1.5 lines). Due for some instructors--by 6:00pm the previous day; other instructors—in class; check with your instructor.

Due: HW #3: Inventory Management

Session 28 – 12/3/14 (Wednesday) / 12/4/14 (Thursday): Final Review

Due Second Littlefield Game Report

Final is scheduled for Friday, December 12, 8:00 am – 10:00am. No early finals are allowed by University policy.

MARSHALL LEARNING GOALS

In this class, emphasis will be placed on the USC Marshall School of Business learning goals as follows:

Goal	Description	Course Emphasis
1	Our graduates will understand types of markets and key business areas and their interaction <i>to effectively manage different types of enterprises</i>	High
2	Our graduates will develop a global business perspective. They will understand how local, regional, and international markets, and economic, social and cultural issues impact business decisions <i>so as to anticipate new opportunities in any marketplace.</i>	Low
3	Our graduates will demonstrate critical thinking skills <i>so as to become future-oriented decision makers, problem solvers and innovators</i>	High
4	Our graduates will develop people and leadership skills to promote their effectiveness as <i>business managers and leaders</i>	Low
5	Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities <i>and aspire to add value to society</i>	Low
6	Our graduates will be effective communicators <i>to facilitate information capture and flow in organizational, social, and intercultural contexts</i>	Moderate