BUAD 311 – Operations Management

Syllabus – Fall 2017

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Marshall Peer Tutoring Schedule at
http://students.marshall.usc.edu/undergrad/marshall-peer-tutoring-program/tutoring-schedule/

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 by 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 Goals

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

The focus of this course is on the Marshall Undergraduate Learning Goals (see pp. 16-17 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.” Upon successful completion of this course, students will be able to:

- Describe the spectrum of operations management activities in a business, and the types of decisions made by operations managers.
- Utilize a variety of tools and techniques effectively to compete successfully in the marketplace, including:
  - Business Process Management.
  - Capacity Management.
  - Waiting Line Management.
  - Optimization.
  - Revenue Management.
  - Inventory and Supply Chain Management.
- Predict, anticipate, and take into account how operations management interfaces with other functional areas such as strategy, accounting, finance, human resources, and marketing.
- Demonstrate 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 (via an experiential learning simulation), and make real-time decisions on capacity, quoted lead-times, work-in-process levels, contracts, and inventory.
- Apply optimization tools and techniques to practical problems, such as formulating and solving linear optimization problems with the Excel Solver to find an optimal market clearing in a timeshare exchange.
- Make operational decisions taking into account the global nature of supply chains (via an experiential learning simulation), the interplay between levels of the supply chain and their locations, and its implications for pricing, competition and customer service.

Required Materials


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.
On Blackboard, you will also find a BUAD 311 Discussion Forum, where pre-session questions, practice questions, and teaching notes will be posted. You can discuss questions, news story, and real-life findings with the instructors, TA, tutors, and your fellow students under various forum topics as well.

**No Recording and Copyright Notice**

It is a violation of USC’s Academic Integrity Policies to share course materials with others without permission. No student may record any lecture, class discussion or meeting with the instructor without prior express written permissions. The word “record” or the act of recording includes, but is not limited to, any and all means by which sound or visual images can be stored, duplicated or retransmitted whether by an electro-mechanical, analog, digital, wire, electronic or other device or any other means of signal encoding. Marshall reserves all rights, including copyright, to the lectures, course syllabi and related materials, including summaries, PowerPoints, prior exams, answer keys, and all supplementary course materials available to the students enrolled in the class whether posted on Blackboard or otherwise. They may not be reproduced, distributed, copied, or disseminated in any media or in any form, including but not limited to all course note-sharing websites. Exceptions are made for students who have made prior arrangements with DSP and the instructor.

**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), write-ups (there will be three write-ups for the cases, but only two submissions will count towards the course grade), performance on Littlefield Simulations, and class participation according to the following weights:

- Participation: 8%
- Homework: 8%
- Quizzes: 8%
- Littlefield Simulations: 6%
- Write-ups: 2%
- Midterm 1: 20%
- Midterm 2: 20%
- Final Exam: 28%

Students may own extra credit via forum participation by helping fellow students and posting news articles on BUAD 311 Discussion Forum. The winning teams of the Littlefield Simulation may also earn extra credit by sharing their planning and executions via a five-minute presentation. Check with your instructor for details.

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 relating to other students. Your grade will be based not 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 key issues to be discussed in class. The pre-session questions on the discussion forum are counted as part of the participation. Your score is based on the best 10 out of 15 pre-session question sets. Your participation in class is evaluated mainly on the quality of your contribution and insights. Some instructors also rely on tools like Arkaive and polleverywhere.

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.

Homework:

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. Instructors reserve the right to bring any potential cheating issues to the administration for further penalties.

Write-up for Case Analysis:

During the course, we will analyze three case studies. All cases will be analyzed and discussed in class. For each case, a PASS/FAIL credit will be given for one-page write-up answering posted discussion questions.

Littlefield Simulation:

Littlefield Labs is a competitive web-based lab simulation (http://www.responsive.net). The student teams will compete to make the most money by managing a lab. It consists of two assignments; each takes one session. Some instructors may allow 1% extra credit for the presentation/video from the winning team.

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. Each team should have 3 or fewer students. The course code for registration is usc.

Scores for individual student contributions to team projects are assigned by the instructor, based on the instructor’s assessment of the team’s working dynamics and project quality, as well as thoughtful consideration of the information provided through your peers.

eBeer Game:

To understand the supply chain dynamics and the bullwhip effect, we play the eBeer Game. The license fee is covered in the Littlefield purchase. The course code for registration is 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 may be called randomly throughout the semester.
The final examination will take place on Thursday, Dec. 7 from 8:00 AM—10:00 AM. The final exam is comprehensive, but greater emphasis will be given to the material taught after midterm 2. 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.” Collaboration of any sort on quizzes and exams is prohibited and will result in an F in the letter grade.

MARSHALL GUIDELINES AND USC POLICIES

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 three or more times prior to the end of week 3 (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.

Students with Disabilities

USC is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. If you have a disability which may impact your performance, attendance, or grades in this course and require accommodations, you must first register with the Office of Disability Services and Programs (www.usc.edu/disability). DSP provides certification for students with disabilities and helps arrange the relevant accommodations. Any student requesting academic accommodations based on a 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 GFS (Grace Ford Salvatori Hall) 120 and is open 8:30 a.m.—5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776. Email: ability@usc.edu.

Support Systems

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.
https://engemannshc.usc.edu/counseling/

National Suicide Prevention Lifeline - 1-800-273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. http://www.suicidepreventionlifeline.org
Relationship & Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. https://engemannshc.usc.edu/rsvp/

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: http://sarc.usc.edu/

Office of Equity and Diversity (OED)/Title IX compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. https://equity.usc.edu/

Bias Assessment Response and Support
Incidents of bias, hate crimes and micro-aggressions need to be reported allowing for appropriate investigation and response. https://studentaffairs.usc.edu/bias-assessment-response-support/

Student Support & Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. https://studentaffairs.usc.edu/ssa/

Diversity at USC – https://diversity.usc.edu/
Tabs for Events, Programs and Training, Task Force (including representatives for each school), Chronology, Participate, Resources for Students

Academic Integrity and Conduct

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 (plagiarism). Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. All students are expected to understand and abide by the principles discussed in the SCampus, the Student Guidebook (www.usc.edu/scampus or http://scampus.usc.edu). A discussion of plagiarism appears in the University Student Conduct Code (section 11.00 and 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.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity http://equity.usc.edu/ or to the Department of Public Safety http://dps.usc.edu/contact/report/. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report or can initiate the report on behalf of another person. Relationship and Sexual Violence Prevention and Services (RSVP) https://engemannshc.usc.edu/rsvp/ provides 24/7 confidential support, and the sexual assault resource center webpage https://sarc.usc.edu/reporting-options/ describes reporting options and other resources.
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 case of a declared emergency if travel to campus is not feasible, the USC Emergency Information web site (http://emergency.usc.edu/) will provide safety and other information, including electronic means by which instructors will conduct class using a combination of USC’s Blackboard learning management system (blackboard.usc.edu), 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.
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<th>Week</th>
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Final Th 12/7 8–10am
Module 1: Business Process Management

Session 1 – Introduction and Overview

Question: What is Operations Management (OM)? Why Operations Management?

Outline: You and your classmates will discover that OM defines business competitiveness and study of OM prepares you to become business leaders and entrepreneurs by qualitatively and quantitatively assessing trade-offs.

Learning Outcomes: By the end of this session, students should be able to

- Define and identify Operations Management problems in real-world situations
- Articulate the importance of OM to business competitiveness, leadership, and entrepreneurship
- Construct and interpret business processes using process flow diagrams
- Describe the potential trade-offs in make-to-stock and make-to-order processes

Text Reading: pp. 2-8, pp. 24-30

Session 2 – Process Measures

Question: How do process flows link to the profits? How do we quantify the performance?

Outline: You will learn that the flow of customers or products into and out of a system determines process measures and ultimately the bottom line.

Learning Outcomes: By the end of this session, students should be able to

- Calculate key performance measures of a process, including capacity, flow rate, and utilization rate
- Define flow time and work-in-process
- Identify the bottleneck that governs the capacity of a process

Text Reading: pp. 30-36

Teaching Note: Process Analysis


Pre-session Questions on Discussion Forum

Session 3 – The Kristen’s Cookie Company

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

Outline: Through this case, you will gain a better understanding of the business profitability through business process analysis; you will evaluate key performance measures under different sales mixes, and recognize the impact of the bottleneck on price and profit.

Learning Outcomes: Through this case, students should be able to

- Conduct business process analysis to assess business profitability
- Evaluate key performance measures under different sales mixes
- Quantify the impact of the bottleneck on price and profit

Text Reading: pp. 355-357 (Appendix B)

Write-up Due: 1 page, spacing 1.5 lines. Check with your instructor for the exact due time.

Session 4 – More on Process Analysis

Question: Is it possible to improve utilization rate and capacity at the same time?

Outline: You will study strategies to meet seasonal demand and how flexible resources help increase system capacity and utilization rate at the same time. Through several examples, we will also solidify our understanding of calculating metrics such as capacity.

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1 Page numbers refer to the page numbers found at the top left/right hand corner of text/eBook.
**Learning Outcomes:** By the end of this session, students should be able to

- Describe strategies for meeting seasonal demand and the impact of variability/seasonality on capacity requirement
- Utilize flexible resources to increase system capacity and utilization rate at the same time
- Calculate performance measures in the presence of multiple products and yield losses

**Text Reading:** pp. 36-42

**Reading:** “Innovation in House Painting? That's Right,” Inc.

**Reading:** “UPS to Add Delivery Surcharges for Black Friday, Christmas Order,” Wall Street Journal.

**Pre-session Questions on Discussion Forum**

**Session 5 – Little’s Law**

**Question:** What is Little’s Law? How can it shed insight onto business process performance?

**Outline:** There is an important 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.

**Learning Outcomes:** By the end of this session, students should be able to

- Link various performance measures using Little’s Law
- Articulate related business insights
- Apply the formula in various environments

**Text Reading:** pp. 8-11

**Due HW 1:** Process Analysis

**Session 6 – Waiting Lines Management**

**Question:** What principles can support us in understanding and managing waiting lines?

**Outline:** We wait. Understanding waiting as a phenomenon 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.

**Learning Outcomes:** By the end of this session, students should be able to

- Define characteristics of a waiting line queueing system
- Explain the effects of variability, utilization rate, and risk pooling on waiting line performance
- Describe the psychology of waiting lines

**Text Reading:** pp. 48-61

**Teaching Note:** Variability and Queues

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

**Pre-session Questions on Discussion Forum**

**Session 7 – Queueing Theory**

**Question:** How can mathematical calculations support optimal performance and revenues?

**Outline:** You will be able to translate real life waiting into variables for use in formulae and mathematical calculations to determine waiting line performance.

**Learning Outcomes:** By the end of this session, students should be able to

- Formulate the quantitative impact of various factors on waiting time
- Apply the formulae to calculate the waiting time of real-life waiting systems
- Explain waiting lines principles using the formulae

**Text Reading:** pp. 61-81

**Quiz 1:** Process Analysis and Little’s Law

**Observation period for the first Littlefield Game starts**
Session 8 – “The Goal”

Question: What is “the Goal” of a firm? How do the concepts we learned interact in a firm?

Outline: The book “The Goal” provides a nice description of the process flows, accounting measures, bottleneck management, and the concepts of the Theory of Constraints and continuous improvement. You will better understand the key concepts we have learned in a real-world setting.

Learning Outcomes: After reading and discussing the book “The Goal,” students should be able to

- Describe the connection between process flows, accounting measures, bottleneck management, as well as the concepts of the Theory of Constraints and continuous improvement in a real-world setting
- Link financial measures to operations measures
- Identify and manage bottlenecks
- Explain the effects of dependent events and statistical fluctuations on processes

Text Readings: The Goal

Reading: “Long Security Lines await at American Airports this Summer,” The Economist.

Pre-session Questions on Discussion Forum

Session 9 – Littlefield Game Round 1

Question: How do we manage capacity and waiting lines in a business? What are the challenges?

Outline: Using a game simulator, you need to forecast, analyze, plan, and manage your enterprise by managing your resources and policies. Your team will compete with your classmates in real time.

Learning Outcomes: After this simulation game with real-time team competition, students should be able to forecast, analyze, plan, and manage the operations of an enterprise by managing its resources and policies.


Pre-session Questions on Discussion Forum

Session 10 – Midterm 1 Review

Reading: “From Tesla to Dunkin' Donuts, One Firm's Quest to Fine-Tune the World,” Bloomberg Businessweek.

Pre-session Questions on Discussion Forum

Session 11 – Midterm 1

Module 2: Optimization

Session 12 – Introduction to Linear Optimization

Question: How do we find the optimal solution? What is linear optimization? How do we solve it?

Outline: 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 optimization problem (LOP) and solve small LOPs using Excel Solver.

Learning Outcomes: By the end of this session, students should be able to

- Identify the powerful impact of optimization on business problems
- Describe components of a linear optimization problem (LOP) and its graphical representation
- Formulate a linear optimization problem and solve it using the Excel Solver

Text Reading: pp. 88-94.

Teaching Note: Linear Programming

Reading: “Coke Engineers Its Orange Juice—With an Algorithm,” Bloomberg Businessweek.

Pre-session Questions on Discussion Forum
Session 13 – Timeshare Exchange Fair

**Question:** How can we build a successful timeshare exchange business? What is “optimal”?

**Outline:** In this case, you will transform a business challenge into a mathematical model. You will also discover optimization is more than linear optimization and learn to formulate an integer optimization problem.

**Learning Outcomes:** Through this case, students should be able to
- Translate a business challenge into a mathematical model
- Formulate an integer optimization problem, an advancement beyond linear optimization

**Text Reading:** pp. 358-368 (Appendix C).

**Write-up Due:** 1 page, spacing 1.5 lines. Check with your instructor for the exact due time.

Session 14 – Interpreting Linear Optimization

**Question:** How can we interpret sensitivity analysis reports when the real-life challenge is vague?

**Outline:** You will practice more advanced LOP in Excel. You will appreciate the value of the Excel reports, which help you understand and interpret how LOP solutions change when the conditions vary.

**Learning Outcomes:** By the end of this session, students should be able to
- Solve an LOP using the Excel Solver
- Interpret sensitivity analysis based on Excel reports for business insights
- Distinguish scenario analysis from sensitivity analysis

**Text Reading:** pp. 94-95.

**Reading:** “How Do You Fix School Bus Routes? Call MIT,” Wall Street Journal.

**Pre-session Questions on Discussion Forum**

Session 15 – Additional Optimization Applications

**Question:** How do Internet companies and traditional companies rely on optimization?

**Outline:** Optimization has become a backbone for many businesses. You will investigate some typical business problems where optimization is used and understand that Internet companies and traditional companies alike are embracing optimization to solve business problems.

**Learning Outcomes:** By the end of this session, students should be able to
- Describe some common optimization problems in the business world, for both Internet companies and traditional companies
- Incorporate scenario analysis into an optimization formulation

**Quiz 2:** Linear Optimization

Session 16 – Decision Tree

**Question:** How can we optimize our decision in an uncertain world? What is a Decision Tree?

**Outline:** The Decision Tree is a schematic model used to manage uncertainty by clearly identifying alternative choices. You will learn how to construct a decision tree—its nodes and branches—and solve for the optimal decision.

**Learning Outcomes:** By the end of this session, students should be able to
- Use decision trees to express alternative choices and to manage uncertainty
- Describe differences between the three types of nodes in a decision tree
- Solve decision tree problems

**Reading:** “Don't Just Analyze Your Business, Optimize It,” Forbes.

**Pre-session Questions on Discussion Forum**

Session 17 – Revenue Management

**Question:** What is Revenue Management? How does it help business to increase profit?

**Outline:** You will understand the key concepts relating to revenue management. In this lesson, you will be able to control capacity to maximize the revenue.

**Learning Outcomes:** By the end of this session, students should be able to
• Apply common revenue management tools
• Identify the elements and trade-offs in a basic capacity control problem to maximize revenue
• Utilize a decision tree to solve these types of problems

**Teaching Note:** Inventory Management

**Reading:** “You Paid What for That Flight?” Wall Street Journal.

**Reading:** “Why Does Air Travel Suck So Bad?” Inc.

**Pre-session Questions on Discussion Forum**

**Session 18 – Guest Lecture**

**Question:** What are the tasks and challenges faced by operations management practitioners?

**Outline:** In this class, operation practitioners will expose you to the challenges and tasks they face. You will gain a better understanding of operational concepts and tools in action.

**Reading:** “Use a ‘Fake’ Location to Get Cheaper Plane Tickets,” Huffington Post.

**Pre-session Questions on Discussion Forum**

**Session 19 – More on Revenue Management**

**Question:** How many seats should an airline overbook? How do we markdown our inventory?

**Outline:** You will learn the underlying marginal analysis idea that solves both the capacity control problem and the overbooking problem. You will also maximize the revenue for your remaining inventory by analyzing historic data and marking-down the price wisely. Your team will compete with your classmates in real time.

**Learning Outcomes:** By the end of this session, students should be able to

• Identify the trade-offs associated with marginal analysis
• Apply marginal analysis to the capacity control and overbooking problems for airlines
• Utilize LOP to maximize the revenue of markdowns in the Retailer Game, with real-time team competition

**Due HW 2:** Decision Tree and Revenue Management

**Session 20 – Midterm 2 Review**

**Reading:** “Why Your Amazon Delivery Sometimes Comes in Walmart Box,” Re/Code.

**Pre-session Questions on Discussion Forum**

**Session 21 – Midterm 2**

**Module 3: Inventory and Supply Chain Management**

**Session 22 – Inventory Management: EOQ**

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

**Outline:** 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.

**Learning Outcomes:** By the end of this session, students should be able to

• Describe the different purposes for keeping inventory
• Explain the trade-offs between economies of scale and inventory cost in a basic inventory problem
• Optimize the amount of inventory using the economic order quantity (EOQ) formula
• Define inventory turns, a key performance measure

**Text Readings:** 11-19, 251-256, 261-264

**Teaching Note:** Inventory Management

**Reading:** “Big Retail Chains Dun Mere Suspects in Theft,” Wall Street Journal.

**Pre-session Questions on Discussion Forum**
Session 23 – Inventory Management: Demand Uncertainty

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

Outline: Inventory is a necessary evil especially when you face demand uncertainty. You will examine the trade-offs and apply marginal analysis to solve the problem optimally. You will also be able to establish an inventory policy when both economies of scale and demand uncertainty are present.

Learning Outcomes: By the end of this session, students should be able to
- Identify the elements and trade-offs of a basic inventory problem
- Apply marginal analysis to optimize inventory decisions in face of demand uncertainty
- Explain the risk pooling effect in inventory systems
- Derive the (ROP, Q) inventory policy when both economies of scale and demand uncertainty are present

Text Readings: pp. 257-261, 264-267


Pre-session Questions on Discussion Forum

Session 24 – Introduction to Forecasting

Question: How do we plan without seeing the future? What makes a good forecast?

Outline: 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 basic methods to forecasting, become skilled at calculating measurement error, and understand the trade-offs between responsiveness and stability in parametric selection.

Learning Outcomes: By the end of this session, students should be able to
- Describe the importance of forecasting for long-term and short-term decisions in finance, marketing, production and service
- Explain basic concepts and components of forecasting
- Measure the forecast error of a forecast method
- Apply the simple moving average model and the exponential smoothing method
- Assess the trade-offs between responsiveness and stability in parametric selection

Text Readings: pp. 108-117, 128-130

Quiz 3: EOQ and Newsvendor

Session 25: Supply Chain Dynamics

Question: What is the “bull-whip” effect? How do our decisions influence others’ decision?

Outline: The success of a company relies on its upstream supplier and downstream distribution partners. Incentives and information are two crucial factors in decision making. You will play the Root Beer game to experience the information distortion in a supply chain.

Learning Outcomes: By the end of this session, students should be able to
- Explain the impact of two crucial factors, incentives and information, in a company’s interaction with its upstream suppliers and downstream distribution partners
- Describe the bull-whip effect, as experienced in the Root Beer Game
- Devise strategies for combating the bull-whip effect

Text Readings: pp. 295-301

Observation period for the second Littlefield Game starts at 8:00 pm, Monday 4/17

Reading: “Clarity is Missing Link in Supply Chain,” Wall Street Journal.

Pre-session Questions on Discussion Forum

Session 26 – Zara

Question: Have you been to a Zara store? How does Zara manage its inventory and supply chain?
Outline: The fashion business is demanding on inventory management because leftovers get significant markdowns. You will study and understand Zara’s supply chain structure and its inventory policy and examine how its operation strategy aligns with its business strategy.

Learning Outcomes: Through this case, students should be able to

- Describe the importance of inventory management in the fashion business, in light of significant markdowns for leftover inventory
- Analyze Zara’s supply chain structure and its inventory policy
- Explain how Zara’s operation strategy aligns with its business strategy

Reading (case): Zara (On Blackboard)

Write-up Due: 1 page, spacing 1.5 lines. Check with your instructor for the exact due time.

Session 27 – Littlefield Game Round 2

Question: How do we manage capacity, inventory, and delivery time? What are the challenges?

Outline: Using a game simulator, you need to forecast, analyze, plan, and manage your enterprise by managing your resources and policies. Your team will compete with your classmates in real time.

Learning Outcomes: After this simulation game with real-time team competition, students should be able to forecast, analyze, plan, and manage the operations of an enterprise by managing its resources and policies.

Due HW 3: Inventory Management

Session 28 – Final Review

Final is scheduled for Thursday, Dec. 7 from 8:00 AM—10:00 AM. No early finals are allowed by University policy.
<table>
<thead>
<tr>
<th>#</th>
<th>Marshall Program Learning Goal Description</th>
<th>Degree of Emphasis</th>
<th>BUAD311 Course Objectives that Support This Marshall Undergraduate Goal</th>
</tr>
</thead>
</table>
| 1   | Our graduates will understand types of markets and key business areas and their interaction to effectively manage different types of enterprises. Specifically, students will: | High               | 1. Understand interfaces with other functional areas  
2. Analyze trade-offs in decision-making  
3. Understand the global nature of supply chain |
| 1.1 | Demonstrate foundational knowledge of core business disciplines, including business analytics and business economics. |                    |                                                                                                                                         |
| 1.2 | Understand the interrelationships between functional areas of business so as to develop a general perspective on business management. |                    |                                                                                                                                         |
| 1.3 | Apply theories, models, and frameworks to analyze relevant markets (e.g. product, capital, commodity, and factor and labor markets). |                    | 2. Analyze trade-offs in decision-making  
3. Understand the global nature of supply chain  
4. Learn waiting line and revenue management  
5. Apply process analysis and capacity management skills to manage a factory in real-time  
6. Apply operations management tools/techniques  
7. Formulate a linear program for optimal product-mix |
| 1.4 | Show the ability to utilize technologies (e.g., spreadsheets, databases, software) relevant to contemporary business practices. |                    | 6. Apply operations management tools/techniques  
7. Formulate a linear program for optimal product-mix  
8. Communicate case analysis with team presentations |
| 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 so as to anticipate new opportunities in any marketplace. | Low                | BUAD311 Course Objectives 1-7 support Goal 2                                                                                           |
| 2.1 | Understand how local, regional and global markets interact and are impacted by economic, social and cultural factors. |                    |                                                                                                                                         |
| 2.2 | Understand that stakeholders, stakeholder interests, business environments (legal, regulatory, competitor) and business practices vary across regions of the world. |                    |                                                                                                                                         |
| 3   | Our graduates will demonstrate critical thinking skills so as to become future-oriented decision makers, problem solvers and innovators. Specifically, students will: | High               | BUAD311 Course Objectives 1-7 support Goal 3                                                                                           |
| 3.1 | Understand the concepts of critical thinking, entrepreneurial thinking and creative thinking as drivers of innovative ideas. |                    |                                                                                                                                         |
| 3.2 | Critically analyze concepts, theories and processes by stating them in their own words, understanding key |                    | 1. Understand interfaces with other functional areas  
2. Analyze trade-offs in decision-making |
components, identifying assumptions, indicating how they are similar to and different from others and translating them to the real world.

4. Learn waiting line and revenue management
5 Apply process analysis and capacity management skills to manage a factory in real-time
6. Apply operations management tools/techniques
7. Formulate a linear program for optimal product-mix

<table>
<thead>
<tr>
<th>3.3</th>
<th>Be effective at gathering, storing, and using qualitative and quantitative data and at using analytical tools and frameworks to understand and solve business problems.</th>
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<tbody>
<tr>
<td></td>
<td>4. Learn waiting line and revenue management. 5 Apply process analysis and capacity management skills to manage a factory in real-time 6. Apply operations management tools/techniques 7. Formulate a linear program for optimal product-mix</td>
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<th>3.4</th>
<th>Demonstrate the ability to anticipate, identify and solve business problems. They will be able to identify and assess central problems, identify and evaluate potential solutions, and translate a chosen solution to an implementation plan that considers future contingencies</th>
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<tr>
<td></td>
<td>1. Understand interfaces with other functional areas. 2. Analyze trade-offs in decision-making 3. Understand the global nature of supply chain 4. Learn waiting line and revenue management 5 Apply process analysis and capacity management skills to manage a factory in real-time 6. Apply operations management tools/techniques 7. Formulate a linear program for optimal product-mix</td>
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<th>4</th>
<th>Our graduates will develop people and leadership skills to promote their effectiveness as business managers and leaders. Specifically, students will:</th>
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<tbody>
<tr>
<td>4.1</td>
<td>Recognize, understand, and analyze the motivations and behaviors of stakeholders inside and outside organizations (e.g., teams, departments, consumers, investors, auditors).</td>
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<td>4.2</td>
<td>Recognize, understand and analyze the roles, responsibilities and behaviors of effective managers and leaders in diverse business contexts e.g., marketing, finance, accounting.</td>
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<td>4.3</td>
<td>Understand factors that contribute to effective teamwork.</td>
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<tr>
<th>4</th>
<th>BUAD311 Course Objectives 1-7 support Goal 4</th>
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<tbody>
<tr>
<td>4.1</td>
<td>1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making 3. Understand the global nature of supply chain 4. Learn waiting line and revenue management</td>
</tr>
<tr>
<td>4.2</td>
<td>1. Understand interfaces with other functional areas 6. Apply operations management tools/techniques</td>
</tr>
<tr>
<td>4.3</td>
<td>5 Apply process analysis and capacity management skills to manage a factory in real-time 6. Apply operations management tools/techniques</td>
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<tr>
<th>5</th>
<th>Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities and aspire to add value to society. Specifically, students will:</th>
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<tbody>
<tr>
<td>5.1</td>
<td>Understand professional codes of conduct.</td>
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<tr>
<td>5.2</td>
<td>Recognize ethical challenges in business situations and assess appropriate courses of action.</td>
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<tr>
<th>5</th>
<th>BUAD311 Course Objectives 1-2 support Goal 5</th>
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<tbody>
<tr>
<td>5.1</td>
<td>1. Understand interfaces with other functional areas</td>
</tr>
<tr>
<td>5.2</td>
<td>1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making</td>
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<th>6</th>
<th>Our graduates will be effective communicators to facilitate information flow in organizational, social, and intercultural contexts. Specifically, students will:</th>
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<tr>
<td>6.1</td>
<td>Identify and assess diverse personal and organizational communication goals and audience information needs</td>
</tr>
<tr>
<td>6.2</td>
<td>Understand individual and group communications patterns and dynamics in organizations and other professional contexts</td>
</tr>
<tr>
<td>6.3</td>
<td>Demonstrate an ability to gather and disseminate information and communicate it clearly, logically, and persuasively in professional contexts.</td>
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<tr>
<th>6</th>
<th>BUAD311 Course Objectives 1 and 6 support Goal 6</th>
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<tbody>
<tr>
<td>6.1</td>
<td>1. Understand interfaces with other functional areas 6. Apply operations management tools/techniques</td>
</tr>
<tr>
<td>6.2</td>
<td>6. Apply operations management tools/techniques, create and defend well-reasoned solutions</td>
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