USC Marshall School of Business

BUAD 311 Operations Management
Spring 2022

Instructor:	**Professor Takayama**	**Professor Drakopoulos**
Office Hours:	Mon, 3:30-5:00PM, Thu 1:30-3:00PM	TBD
Location:	Some office hours will be in person and some remote. See Slack channel **#spring22-buad-311-takayama**	TBD
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Course Description

How do organizations such as financial institutions, health care providers, manufacturing plants, and tech companies 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 systematically in the global business world.

Operations managers are primarily concerned with the design, procurement, production, and delivery of goods and services. They are responsible for planning, designing, operating, controlling and improving the various procurement, production, storage, and shipping processes involved, from the time the product or service is designed until customer delivery occurs. The challenge for operations managers is to produce goods and services and deliver them in an efficient manner according to the business strategy of their company. Typically, this involves balancing the trade-offs between 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. 14-15 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:

- Goal 1: Describe the spectrum of operations management activities in a business, and the types of decisions made by operations managers.
- Goal 2: 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.
- Goal 3: Predict, anticipate, and take into account how operations management interfaces with other functional areas such as strategy, accounting, finance, human resources, and marketing.
- Goal 4: Demonstrate critical thinking skills to assess trade-offs in process design, capacity allocation, inventory levels, and customer service.
- Goal 5: Apply optimization tools and techniques to practical problems; for example, use the Excel Solver to formulate and solve a linear optimization problem.
- Goal 6: Apply critical thinking and problem-solving and make real-time decisions on capacity, quoted lead-times, work-in-process levels, contracts, and inventory.
- Goal 7: 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.

Materials

For most of the class, lecture notes and materials on blackboard will be sufficient. You may choose to purchase a copy of the custom BUAD 311 textbook or access pertinent chapters from ARES at no cost (see below).

- *BUAD 311 Operations Management*: Custom-made textbook available in eBook format at https://create.mheducation.com/shop/, ISBN: 9781121107915. **(*This is optional*.)**

- Four relevant chapters (Textbook chapters 2, 3, 8 and LP with Solver) from the text are available for free on ARES Course Reserves. For instructions on how to access Ares, see Blackboard → Resources → BUAD 311 Textbook.

Prerequisites and/or Recommended Preparation

Co-requisite: BUAD 310 or BUAD 312 or EE 364 or MATH 407

Course Notes

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

Copyright Notice

All lectures will be automatically recorded and available on Blackboard. **No student may record any lecture, class discussion, office hours or meeting with the instructor without prior express written permissions.** It is a violation of USC's Academic Integrity Policies to share course materials with others without permission. 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 only for students who have made prior arrangements with DSP and the instructor.

ASSIGNMENTS AND GRADING DETAIL

Participation	10%
Write-ups (2 cases)	2%
Quizzes and Exams	
• Quizzes (best 2 out of 3)	10%
• Midterm 1	23%
• Midterm 2	23%
• Final Exam	32%

The weights listed above determine a student's overall course grade for this class. The course grade represents one's performance relative to other students in the class. 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 your section.

Class Attendance & Participation

Students are expected to attend all class sessions in their enrolled section. Your participation score is based on your contributions to the lectures including, but not limited to thoughtfully responding to the instructor's prompts; asking questions; answering other students' questions; and sharing personal or professional experiences related to course content.

BUAD 311 involves several simulation games, particularly in the second half of the course. Your performance on these simulation games will be taken into account when computing your participation grade.

Write-ups

There will be two write-ups for the course, one for each of the two cases. Each contributes 1% to the course grade. Write-ups are short essays in response to posted discussion questions, and are graded PASS or FAIL based on completion and accuracy. **Write-ups are to be submitted on Blackboard.** Students are responsible for familiarizing themselves with the Blackboard assignment submission interface and uploading assignments ahead of time; instructors or TAs are not responsible for individual technical difficulties related to Blackboard assignment submission.

Quizzes

There are three quizzes, of which the best two will count towards the course grade for 5% each. Quizzes are not cumulative. Quizzes are meant to help keep you "on track" with the course material. To help you prepare, approximately a week before each quiz a short set of quiz questions will be distributed. You are free to work in groups on these questions (and encouraged to do so), but **you cannot ask the TA, peer tutors or instructors for help with them**. On the day of the quiz in class, one of the questions will be randomly selected from the quiz preparation materials, with slightly different numbers and small modifications. If you have done the quiz preparation questions diligently, the quiz will be very easy for

you. Solutions to the quizzes will be distributed only after all sections have taken the quiz, at which point you are free to meet with the TA, peer tutors or instructor for help with the questions. Unless stated otherwise, all quizzes are closed books and there are no crib-sheets permitted for quizzes. Each student should bring a stand-alone calculator capable of power and square root operations. Collaboration of any sort on quizzes is strictly prohibited and will result in an "F" in the course grade. Any suspicion of cheating will be reported and investigated by USC. Please see the "Academic Integrity and Conduct" section below for further details.

Midterm and Final Exam

There are two midterm exams and a final exam; the final exam is ***non-cumulative***. All exams are closed books. Each student may bring two letter-sized (8.5"x11") double-sided crib sheets for each exam. Each student should also bring a stand-alone calculator capable of power and square root operations. Students may not share the same crib sheet or calculator during a test. Collaboration of any sort on exams is strictly prohibited and will result in an "F" in the course grade. Any suspicion of cheating will be reported and investigated by USC. Please see the "Academic Integrity and Conduct" section below for further details.

The final examination will take place on Thursday, May 5, 11:00 AM - 1:00 PM PDT. 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*."

Students must attend all quizzes and exams at the indicated times and dates, in their enrolled sections. If you foresee a conflict, you must contact the instructor within the first three weeks of the semester to explore alternative options, to be determined by the entire 311 teaching team. No rescheduling of exams will be allowed after the first three weeks of class. The only exception is a "documented medical emergency," for which the student must provide all of the following documentation by the time of the exam: (1) A signed doctor's note, with the name and phone number of the medical professional verifying the medical emergency; (2) An email from the student's Marshall advisor; (3) An email from a USC Support and Advocacy advisor (see "Support Systems" below). For all other reasons of missing a quiz or an exam, including travels for non-emergencies, interviews, adverse traffic conditions, or forgetfulness about exam time, the student will not be allowed to reschedule, and missing a quiz or an exam will result in a zero for the quiz or the exam.

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. Per the USC Schedule of Classes, the last day to drop this course without a mark of "W" and receive a refund is February 1, 2022. The last day to change between letter grade and pass/no pass for this course, as well as to drop this course with a mark of "W", is April 8, 2022.

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 Student Accessibility Services (https://osas.usc.edu/). OSAS 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 Student Accessibility Services (OSAS) each semester. A letter of verification for approved accommodations can be obtained from OSAS. Please be sure the letter is delivered to me (or to your TA) as early in the semester as possible. OSAS 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 OSAS is (213) 740-0776. Email: osasfrontdesk@usc.edu.

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.

Class Conduct

Professionalism will be expected at all times. Because the university classroom is a place designed for the free exchange of ideas, we must show respect for one another in all circumstances. We will show respect for one another by exhibiting patience, courtesy, and professionalism in our exchanges. Appropriate language and restraint from verbal attacks upon those whose perspectives differ from your own is a requirement. Courtesy and kindness are the norm for those who participate in my class.

USC Statement on Academic Conduct and Support Systems

Academic Conduct:

Students are expected to make themselves aware of and abide by the University community's standards of behavior as articulated in the Student Conduct Code.

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. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" https://policy.usc.edu/scampus-part-b/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Support Systems:
Counseling and Mental Health - (213) 740-9355 – 24/7 on call
https://studenthealth.usc.edu/counseling/
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
https://suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.
Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
https://studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
https://equity.usc.edu, https://titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
https://usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services - (213) 740-0776
https://osas.usc.edu/
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710
https://campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
https://diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
https://dps.usc.edu, https://emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
https://dps.usc.edu
Non-emergency assistance or information.

COURSE CALENDAR

Week	Session	Dates	Topic	Assignment
1	1	M 1/10 & T 1/11	Introduction and Overview	
	2	W 1/12 & Th 1/13	Process Measures	
2		M 1/17 & T 1/18	No Class (MLK Day)	
	3	W 1/19 & Th 1/20	Kristen's Cookie Company	Case write-up (Check Blackboard for the due date)
3	4	M 1/24 & T 1/25	More on Process Analysis	
	5	W 1/26 & Th 1/27	Little's Law	
4	6	M 1/31 & T 2/1	Waiting Line Management	Quiz 1 (Quiz preparation questions will be distributed on Friday 1/28)
	7	W 2/2 & Th 2/3	Queueing Theory I	
5	8	M 2/7 & T 2/8	Queueing Theory II	
	9	W 2/9 & Th 2/10	Problem Solving using Process Analysis/Queuing Theory	
6	10	M 2/14 & T 2/15	Midterm 1 Review	
	11	W 2/16 & Th 2/17	**MIDTERM EXAM 1**	
7		M 2/21& T 2/22	No Class (President's Day Holiday)	
	12	W 2/23 & Th 2/24	Intro to Linear Optimization	
8	13	M 2/28 & T 3/1	Solving Linear Optimization – Excel Solver	
	14	W 3/2 & Th 3/3	Interpreting Linear Optimization	
9	15	M 3/7 & T 3/8	Additional Optimization Applications	
	16	W 3/9 & Th 3/10	Decision Trees	Quiz 2 (Quiz preparation questions will be distributed on Friday 3/4)
10		M 3/14 & T 3/15	No Class (Spring Break)	
		W 3/16 & Th 3/17		
11	17	M 3/21 & T 3/22	Revenue Management: Intro & Pricing	
	18	W 3/23 & Th 3/24	Revenue Management: Pricing & Capacity Control	
12	19	M 3/28 & T 3/29	Midterm 2 Review	
	20	W 3/30 & Th 3/31	**MIDTERM EXAM 2**	
13	21	M 4/4 & T 4/5	Inventory Management: EOQ	
	22	W 4/6 & Th 4/7	Inventory Management: Uncertainty	
14	23	M 4/11 & T 4/12	Inventory Management: Continuous Review	
	24	W 4/13 & Th 4/14	Intro to Forecasting	
15	25	M 4/18 & W 4/19	Advanced Topics in OM-1	
	26	W 4/20 & Th 4/21	Advanced Topics in OM-2	

16	27	M 4/25 & T 4/26	Zara	Quiz 3 (Quiz preparation questions will be distributed on Friday 4/22); Case write-up (Check Blackboard for the due date)
	28	W 4/27 & Th 4/28	Final Review	
Final Exam	Th 5/5 11:00 am – 1:00 pm PDT			

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

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

Session 3 – 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

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.

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

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

Session 6 – Waiting Line 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

Sessions 7 and 8 – Queuing 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

Session 9 – Problem Solving using Process Analysis and Queuing Theory
Learning Outcomes: By the end of this session, students should be able to:

- Recognize the relationship between queuing theory and process analysis
- Apply knowledge gained in previous classes to solving problems

Session 10 – Midterm 1 Review

Session 11 – Midterm 1 Exam

Module 2: Optimization

Sessions 12 and 13 – Introduction to Linear Optimization and Solving 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)
- Formulate a linear optimization problem and solve it using the Excel Solver

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

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

Session 16 – Decision Trees
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

Session 17 – Revenue Management: Introduction and Pricing
Question: What is Revenue Management? How does it help business to increase profit? How to set prices?
Outline: You will understand the key concepts of revenue management. In this lesson, you will use an online platform to understand how to use consumer valuation information to set prices.
Learning Outcomes: By the end of this session, students should be able to

- Learn how to set prices based on customer valuation information
- Employ an analytical approach to make pricing decisions.

Session 18 – Revenue Management: More Pricing & Capacity Control
Question: How many seats should you reserve for your premium customers?
Outline: You will face an example of decision making under uncertainty by solving the capacity control problem on an online platform. You will learn the underlying marginal analysis idea that solves the capacity control problem.
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 problem.

Session 19 – Midterm 2 Review

Session 20 – Midterm 2 Exam

Module 3: Inventory and Supply Chain Management

Session 21 – 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

Session 22 – Inventory Management: 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 the 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

Session 23 – Inventory Management: Continuous Review
Question: We establish and analyze 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

- Explain the risk pooling effect in inventory systems in a dynamic manner.
- Derive the (ROP, Q) inventory policy when both economies of scale and demand uncertainty are present

- Understand the tradeoffs between uncertainty, delay, and inventory decisions.

Session 24--26 – Introduction to Forecasting/Advancde Topics in OM
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. You will also learn the basics of Supply chain management
Learning Outcomes: By the these sessions, 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
- Understand the structure of supply chains
- Buy-back contracts in supply chains

Session 27– 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

Session 28 – Final Review

Final exam: Thursday, May 5, 11:00 AM - 1:00 PM PDT

Contribution of BUAD311 Operations Management to Student Achievement of Marshall's Six Undergraduate Program Learning Goals			
#	**Marshall Program Learning Goal Description**	**Degree of Emphasis**	**BUAD311 Course Learning Goals that Support This Marshall Undergraduate Goal**
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**	**BUAD311 Course Objectives 1-7 support Goal 1**
1.1	Demonstrate foundational knowledge of core business disciplines, including business analytics and business economics.		1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making 3. Understand the global nature of supply chain
1.2	Understand the interrelationships between functional areas of business so as to develop a general perspective on business management.		1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making 3. Understand the global nature of supply chain 6. Apply operations management tools/techniques 7. Formulate a linear program for optimal product-mix
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
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 Learning Goals 1, 2, 3, 5, and 6 support Marshall Goal 2**
2.1	Understand how local, regional and global markets interact and are impacted by economic, social and cultural factors.		1. Understand interfaces with other functional areas 3. Understand the global nature of supply chain
2.2	Understand that stakeholders, stakeholder interests, business environments (legal, regulatory, competitor) and business practices vary across regions of the world.		1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making 3. Understand the global nature of supply chain 5 Apply process analysis and capacity management skills to manage a factory in real-time 6. Apply operations management tools/techniques
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 Learning Goals 1-7 support Marshall Goal 3**
3.1	Understand the concepts of critical thinking, entrepreneurial thinking and creative thinking as drivers of innovative ideas.		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

3.2	Critically analyze concepts, theories and processes by stating them in their own words, understanding key components, identifying assumptions, indicating how they are similar to and different from others and translating them to the real world.		1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making 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
3.3	Be effective at gathering, storing, and using qualitative and quantitative data and at using analytical tools and frameworks to understand and solve business problems.		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
3.4	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		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
4	**Our graduates will develop people and leadership skills to promote their effectiveness as *business managers and leaders.* Specifically, students will:**	**Mode rate**	**BUAD311 Course Learning Goals 1-6 support Marshall Goal 4**
4.1	Recognize, understand, and analyze the motivations and behaviors of stakeholders inside and outside organizations (e.g., teams, departments, consumers, investors, auditors).		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
4.2	Recognize, understand and analyze the roles, responsibilities and behaviors of effective managers and leaders in diverse business contexts e.g., marketing, finance, accounting.		1. Understand interfaces with other functional areas 6. Apply operations management tools/techniques
4.3	Understand factors that contribute to effective teamwork.		5 Apply process analysis and capacity management skills to manage a factory in real-time 6.Apply operations management tools/techniques
5	**Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities *and aspire to add value to society.* Specifically, students will:**	**Low**	**BUAD311 Course Learning Goals 1 and 2 support Marshall Goal 5**
5.1	Understand professional codes of conduct.		1. Understand interfaces with other functional areas
5.2	Recognize ethical challenges in business situations and assess appropriate courses of action.		1. Understand interfaces with other functional areas 2. Analyze trade-offs in decision-making
6	**Our graduates will be effective communicators *to facilitate information flow in organizational, social, and intercultural contexts.* Specifically, students will:**	**Mode rate**	**BUAD311 Course Learning Goals 1 and 6 support Marshall Goal 6**
6.1	Identify and assess diverse personal and organizational communication goals and audience information needs		1. Understand interfaces with other functional areas 6. Apply operations management tools/techniques
6.2	Understand individual and group communications patterns and dynamics in organizations and other professional contexts		

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