

Professor: Professor Kathy Takayama  
Office: BRI 401T  
Because of ongoing COVID-19 safety precautions, I may need to host office hours via Zoom instead of in my office, so before dropping by, be sure to book an appointment (see Slack for Calendly link)

Office Hours: **General Office Hours:**  
Mon 7:00-8:00 PM  
Wed 10:00-11:00 AM  
**1-1 Meetings:**  
15 min - to discuss grades or private concerns  
30 min - mentoring advice, or if you need more private time  
See **#fall21-buad-311-takayama-officehours** to register & attend both General Office Hours and 1:1 Meetings

Email: None. Use Slack!  
For **public** questions, that everyone would benefit, post on the public channel, **#fall21-buad-311-takayama**.  
For **private** messages, send me a DM

TA: Junxiong Yin  
Office: TA Office Hours will be held on Zoom; register via Calendly  
See **#fall21-baud-311-takayama-officehours** to register & attend

Office Hours: T 12 -2 pm (General)  
F 9-11 am (Recitation)

Email: None; send Slack DM

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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. 18-20 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 considering 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.

## **Contacting me:**

*I will not be using email for this course.* Instead, I will use Slack.

Slack is available (for free) to all USC students, and you should have already been added to our 2 class channels

- **#fall21-buad311-takayama**: All materials for the course will be posted here
- **#fall21-buad311-takayama-officehours**: Post here if you want to attend my scheduled office hours each week, and to find out that week’s location for office hours, plus find a link to the TA’s Calendly for his office hours.

If you haven't been added to these channels, send me a DM on Slack, and I will add you. Familiarize yourself with Slack and how to use it. Some help is on IT's website: <https://cio.usc.edu/digital-campus-slack/> It is very important you set up slack on your phone or computer and check it regularly. Although course materials will be stored on Blackboard, all announcements, session recaps, and Q&A will all be on Slack.

If you have a question about course material, do not send me an email. Please instead send a (public) Slack message to the class channel: **#fall21-buad311-takayama**. Everyone benefits from seeing questions (and their answers), so please don't be shy. By the same token, if you know the answer to a question your peer has asked, PLEASE respond. Explaining an idea to a colleague not only helps cement that idea in your own mind, but it's a required skill in modern professional environments. Class participation points are partially allocated based on your participation on Slack.

Occasionally, you may need to contact me about a private matter (e.g., an illness, or a grading mistake). In that case, please use the direct message feature. If upon reading your message, I deem it should be public, instead, I might ask you to resend to the public class Slack channel so that all students can benefit from the question and answer.

Please keep in mind that Slack is as much part of the academic environment of this course as is class-time. Hence, please keep language professional (but fun!). You know how to be a good citizen. Just do what you know.

### **Office Hours:**

For COVID safety, I will initially be hosting all office hours on Zoom. See Slack for the links and later in the semester, for updates of when we can meet in my office or meet at an outside location.

There are two types of office hours for this course:

- **General (Open) Office Hours:**  
These are drop-in sessions to ask a question about the course material, practice sets or any other class topic, or just say, "hi." Be sure to register ahead of time so I can be sure to let you know where we will be meeting (Zoom or in person).
- **1-1 (Private) Office Hours:**  
These are 15-minute or 30-min private reserve slots spread throughout my schedule. These can be booked up to one week in advance.

For BOTH types of office hours, sign-up on Calendly (Links on **#fall21-buad311-takayama-officehours** Slack channel) at the very latest by midnight of the previous day. If I see that no one is planning to come to office hours, I may cancel them for that day.

## **Materials**

For most of the class, lecture notes and materials on blackboard will be sufficient. Some of the required cases, however, are published in our custom textbook. You may choose to purchase a copy, borrow a friend's, or use one of the copies on reserve below.

- BUAD 311 Operations Management: Custom-made textbook available in eBook format at <https://create.mheducation.com/shop/>, ISBN: 9781308430478. (*This is optional, \$88*)
- Four relevant chapters (Textbook chapters 2, 3, and 8) from the text are available for **free** on ARES. To access these chapters:
  - Login to <https://reserves.usc.edu> using your USC net-id and password.
  - Under Student Tools, select Search Courses. In the Course Number Contains field, type 311 then click Go.
  - Click Add Course to add it to your Ares library.
  - When you click View Course, you will see Chapters 2, 3, 8 and LP with solver, which are the only chapters required for BUAD 311. If you would like additional chapters, you can purchase the eBook listed above.
  - For more information on how to use course reserves, check here <https://libguides.usc.edu/distancelearning/coursereserves>
- Kristen's *Cookies* – If you decide not to purchase the text, you can access the Harvard Case study here: <https://hbsp.harvard.edu/import/851132> (\$4.25)

Finally, the EBeer Game is a simulation game that will be played in the second half of the course. Students must register for the game prior to Session **26** to play.

- **Instructions for registering will be available on Slack.** Registering costs approximately \$12. If, for **any** reason, a student has financial difficulties registering for the game, they should contact me and I will make alternative arrangements, no questions asked.

## **Prerequisites and/or Recommended Preparation**

Co-requisite: BUAD 310

## **Course Notes**

Please check our slack channel (**#fall21-buad311-takayama**) for class preparation materials or announcements. Lecture slides will be posted **at the above slack channel**. If you would like hard copies of them, it will be your responsibility to print them out.

## **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 only for students who have made prior arrangements with Osas and the instructor.

## ASSIGNMENTS AND GRADING DETAIL

Participation/Preparation (see below for details)	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. This course is designed to be sufficiently challenging that the average grade is expected to be a B+. Your grade will be based on your overall score for the course, as well as your ranking among the other students.

### Class Participation/Preparation

Class participation/preparation grade is a combination of 2 elements:

- Discussion/questions/contributions in class
- Any questions, or responses to your peer’s questions on Slack

### Write ups

There will be two case write-ups for the course. 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, instructors or anyone outside of the BUAD 311 class this semester 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.

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. You **cannot** use a smartphone or laptop for this purpose.

Collaboration of any sort on quizzes during the quiz is strictly prohibited and will result at least in an “F” in the course grade and being reported to SJACS. Any suspicion of cheating will be reported and investigated by USC. Please see the “Academic Integrity and Conduct” section below for further details.

*See below for important notes on OSAS accommodations.*

### **Midterms and Final Exam**

There are two midterm exams and one final exam, all of which are cumulative, but greater emphasis will be given to materials since the previous exam. All exams are closed books. Each student may bring one letter-sized (8.5”x11”) double-sided crib sheet 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. You may not use a smartphone or laptop as a calculator.

Collaboration of any sort on exams is strictly prohibited and will result in at least an “F” in the course grade and being reported to SJACS. 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 Dec 9, 8-10 am. 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.”*

**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 no less than three weeks prior to the quiz/exam to explore alternative options, to be determined by the entire 311 teaching team.** We all are also well aware that unforeseen emergencies (particularly medical) may arise, however. While flexibility is the goal in the event of an emergency, an alternative accommodation cannot be universally guaranteed. To maximize the likelihood of alternative options, students should provide as much **advanced notice and documentation** as the situation allows. For example, in a “documented medical emergency” the student should provide as much of the following documentation as possible 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.

*See below for important notes on OSAS accommodations.*

## **MARSHALL GUIDELINES AND USC POLICIES**

### ***In Person/Remote Instruction in Fall 2021***

Marshall will accommodate students who are unable to attend classes in person for the following reasons and by approval only:

1. Students for whom it would be medically unsafe to attend classes.
  - These students should promptly contact USC’s Office of Student Accessibility Services (OSAS) regarding the registration process for accommodations.
  - If students receive an accommodation letter from OSAS, they must notify their course instructors directly.
2. Students who are overseas and unable to enter the United States prior to the start of the Fall semester because of visa or travel restrictions beyond their control.
  - These students should complete the petition to request special accommodation for Marshall and Leventhal classes either for the entire term or until they arrive in country.
  - If approved, students will receive a letter from the Marshall International Programs office and must notify their course instructors directly.

To accommodate approved remote learners for BUAD 311 in Fall 2021, there will be one synchronous Zoom connection to the in-room class session on Tuesday/Thursday 8:00 am – 9:50 am, taught by me, Prof. Kathy Takayama. All students with remote learning approval (regardless of their registered section) will be given access to the Zoom link. In addition to this, there will be asynchronous recordings of each day’s session from each instructor. To accommodate dynamic health scenarios, all students will have access to the recordings of their instructor.

### ***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 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](mailto:osasfrontdesk@usc.edu).

For students with certain disability testing accommodations, such as 1.5X time, the accommodation may be administered by the professor instead of OSAS Testing services. In this case, the procedure for accommodation differs for quizzes, midterms and the final exam. There will be a special Slack channel only for OSAS students to keep you up-to-date on exam logistics, **#fall21-buad-311-takayama-osas**.

- **Quizzes:** There will be two special sessions set up in the same week as the quiz at 8:00 am. Students who wish to use their accommodation should make arrangements with their professor at least 2 weeks before the quiz to attend one of these two sessions. On the day of the quiz, they should arrive "late" to class, allowing their classmates time to take the quiz.
- **Midterms:** Midterms will be designed at 70 min standard time. OSAS students with 1.5X accommodation will simply "stay longer" to complete their midterms in their assigned class session.
- **Final Exam:** Special arrangements will be made for the final exam. Please reach out to your instructor for details.

### ***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 (<https://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 <https://blackboard.usc.edu>.

## **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](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

1	M 8/23 & T 8/24	Introduction and Overview	
2	W 8/25 & Th 8/26	Process Measures	
3	M 8/30 & T 8/31	Kristen's Cookie Company	Case write-up (Check Blackboard for due date)
4	W 9/1 & Th 9/2	More on Process Analysis	
M 9/6: No Class for Labor Day			
5	T 9/7	Guest Lecture: Conor Sweeny	
6	W 9/8 & Th 9/9	Little's Law	
7	M 9/13 & T 9/14	Waiting Line Management	Quiz 1 (Quiz prep questions will be distributed on 3 Sept)
8	W 9/15 & Th 9/16	Queueing Theory I	
9	M 9/20 & T 9/21	Queueing Theory II	
10	W 9/22 & Th 9/23	Midterm 1 Review	
11	M 9/27 & T 9/28	Midterm 1	
12	W 9/29 & Th 9/30	Intro to Linear Optimization	
13	M 10/4 & T 10/5	Solving Linear Optimization – Excel Solver	
14	W 10/6 & Th 10/7	Interpreting Linear Optimization	
15	M 10/11 & T 10/12	Additional Optimization Applications	
16	W 10/13	NA	
Th 10/14: No Class: Fall Recess			
17	M 10/18 & T 10/19	Decision Trees and Sequential Decision-making	Quiz 2 (Quiz prep questions will be distributed 8 Oct)
18	W 10/20 & Th 10/21	Revenue Management: Introduction & Pricing	
19	M 10/25 & T 10/26	Revenue Management: Price Discrimination	
20	W 10/27 & Th 10/28	Midterm 2 Review	
21	M 11/1 & T 11/2	Midterm 2	
22	W 11/3 & Th 11/4	Inventory Management: EOQ	
23	M 11/8 & T 11/9	Inventory Management: Uncertainty and Newsvendor	

24	W 11/10 & Th 11/11	Inventory Management: Continuous Review	
25	M 11/15 & T 11/16	Intro to Forecasting I	Quiz 3 (Quiz preparation questions will be distributed on 5 Nov.)
26	W 11/17 & Th 11/18	Intro to Forecasting II/Intro to Supply Chain Management	
27	M 11/22 & T 11/23	EBeer Game (in class)	
W 11/24 – Su 11/28: Thanksgiving Break			
28	M 11/29 & T 11/30	Case Discussion: Supply-Chain	Case Write-up Due on BB
29	W 12/1 & Th 12/2	Final Exam Review and Wrap-up	
Final	Th Dec 9	8 am–10 am Check Slack for room and other details.	

## **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 – Guest Lecture: Conor Sweeney (Tuesday lecture only)**

### **Session 6 – 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 7 – 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 8 and 9 – 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 10 – Midterm 1 Review**

### **Session 11 – Midterm 1**

## **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 – N/A (Wednesday sections only)**

### **Session 17 – 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 18 – 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 be using 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.

### **Sessions 19 – Revenue Management: Price Discrimination and Dynamic Pricing**

**Question:** Does everyone pay the same price for the same product?

**Outline:** *Price discrimination is pervasive in modern markets, often through coupons, rebates, and targeted advertising. You will learn the basic ideas behind price discrimination and a particular way price discrimination is often implemented called dynamic pricing.*

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

- Compute optimal prices for given segmentation of a market
- Weigh costs and benefits of price discrimination strategies for a business
- Implement dynamic pricing strategies from data

**Session 20 – Midterm 2 Review**

**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

**Session 23 – 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 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 24 – 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 25 and 26 – Introduction to Forecasting/Introduction to Supply Chains**

**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 end of 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

### **Session 27 – Supply Chain Dynamics – EBeer 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 root beer game to experience the information distortion in a supply chain. By the end of the game, students should

- Experience the bull-whip effect via the beer game
- Understand this common business phenomenon
- Learn how to combat the bull-whip effect

### **Session 28 – Case Review: Supply-Chain and Operations Strategy**

**Question:** How do all the operational pieces of a firm combine to form a business strategy?

**Outline:** We will complete a case discussion reviewing the different operational concepts we have learned in the course and how they fit together to form the business strategy of a firm.

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

- Identify the key operational questions in a particular business
- Connect these operational questions to the firms profit and value proposition

### **Session 29 – Final Review**

**Final exam: Thursday, May 7, 11:00 AM - 1:00 PM - See Blackboard for details.**

<b>Contribution of BUAD311 Operations Management to Student Achievement of Marshall's Six Undergraduate Program Learning Goals</b>			
<b>#</b>	<b>Marshall Program Learning Goal Description</b>	<b>Degree of Emphasis</b>	<b>BUAD311 Course Learning Goals that Support This Marshall Undergraduate Goal</b>
1	<b>Our graduates will understand types of markets and key business areas and their interaction to effectively manage different types of enterprises. Specifically, students will:</b>	High	<b>BUAD311 Course Objectives 1-7 support Goal 1</b>
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	<b>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</b>	Low	<b>BUAD311 Course Learning Goals 1, 2, 3, 5, and 6 support Marshall Goal 2</b>
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	<b>Our graduates will demonstrate critical thinking skills so as to become future-oriented decision makers, problem solvers and innovators. Specifically, students will:</b>	High	<b>BUAD311 Course Learning Goals 1-7 support Marshall Goal 3</b>

3.1	Understand the concepts of critical thinking, entrepreneurial thinking and creative thinking as drivers of innovative ideas.		<ol style="list-style-type: none"> <li>1. Understand interfaces with other functional areas</li> <li>2. Analyze trade-offs in decision-making</li> <li>3. Understand the global nature of supply chain</li> <li>4. Learn waiting line and revenue management</li> <li>5 Apply process analysis and capacity management skills to manage a factory in real-time</li> <li>6. Apply operations management tools/techniques</li> <li>7. Formulate a linear program for optimal product-mix</li> </ol>
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.		<ol style="list-style-type: none"> <li>1. Understand interfaces with other functional areas</li> <li>2. Analyze trade-offs in decision-making</li> <li>4. Learn waiting line and revenue management</li> <li>5 Apply process analysis and capacity management skills to manage a factory in real-time</li> <li>6. Apply operations management tools/techniques</li> <li>7. Formulate a linear program for optimal product-mix</li> </ol>
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.		<ol style="list-style-type: none"> <li>4. Learn waiting line and revenue management.</li> <li>5 Apply process analysis and capacity management skills to manage a factory in real-time</li> <li>6. Apply operations management tools/techniques</li> <li>7. Formulate a linear program for optimal product-mix</li> </ol>
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		<ol style="list-style-type: none"> <li>1. Understand interfaces with other functional areas.</li> <li>2. Analyze trade-offs in decision-making</li> <li>3. Understand the global nature of supply chain</li> <li>4. Learn waiting line and revenue management.</li> <li>5 Apply process analysis and capacity management skills to manage a factory in real-time</li> <li>6. Apply operations management tools/techniques</li> <li>7. Formulate a linear program for optimal product-mix</li> </ol>
4	<b>Our graduates will develop people and leadership skills to promote their effectiveness as <i>business managers and leaders</i>. Specifically, students will:</b>	<b>Mod erate</b>	<b>BUAD311 Course Learning Goals 1-6 support Marshall Goal 4</b>
4.1	Recognize, understand, and analyze the motivations and behaviors of stakeholders inside and outside organizations (e.g., teams, departments, consumers, investors, auditors).		<ol style="list-style-type: none"> <li>1. Understand interfaces with other functional areas</li> <li>2. Analyze trade-offs in decision-making</li> <li>3. Understand the global nature of supply chain</li> <li>4. Learn waiting line and revenue management</li> </ol>
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.		<ol style="list-style-type: none"> <li>1. Understand interfaces with other functional areas</li> <li>6. Apply operations management tools/techniques</li> </ol>
4.3	Understand factors that contribute to effective teamwork.		<ol style="list-style-type: none"> <li>5 Apply process analysis and capacity management skills to manage a factory in real-time</li> </ol>

			6. Apply operations management tools/techniques
5	<b>Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities and aspire to add value to society. Specifically, students will:</b>	<b>Low</b>	<b>BUAD311 Course Learning Goals 1 and 2 support Marshall Goal 5</b>
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	<b>Our graduates will be effective communicators to facilitate information flow in organizational, social, and intercultural contexts. Specifically, students will:</b>	<b>Mod erate</b>	<b>BUAD311 Course Learning Goals 1 and 6 support Marshall Goal 6</b>
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		
6.3	Demonstrate an ability to gather and disseminate information and communicate it clearly, logically, and persuasively in professional contexts.		6. Apply operations management tools/techniques, create and defend well-reasoned solutions