

# OPMGT 502: Introduction to Operations Management

Autumn 2020

Foster School of Business, University of Washington, Seattle

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## Overview and Objectives

Operations Management (OM) is the design and management of the processes that transform inputs into finished goods or services. World-class performance in operations is essential for a company's competitive success and long-term survival. This translates into a continuous search for ideas to improve a company's operations. The objective of this course is to give you a solid foundation in the models and principles that are necessary to generate operations improvements.

The practice of Operations Management is characterized by a great deal of diversity. Problems and opportunities for improvement appear different in different business contexts such as manufacturing, services and knowledge work, projects, distribution & fulfillment, and supply chains. Our unifying framework is to look at different types of OM issues through the lens of *flow*: the flow of work and the flow of materials. This perspective allows us to focus on the most important decisions in operations and supply chains: *capacity, process improvement and inventory*.

We interpret different contexts in terms of flow elements, model and analyze major decisions, and discuss the applications of these models to generate and evaluate improvement ideas. The course objectives are: (1) to prepare you to see the world in terms of flows of work and material, (2) to provide you with models and concepts to analyze these flows, (3) to offer you practice in the application of these models to generate improvement ideas and, finally, (4) to motivate you to spot opportunities for such improvements in your workspace.

The class structure is divided into three sections. After introducing the course in session 1, we will divide the rest of the sessions as follows:

Section 1: Improvements through capacity decisions: Capacity & Time. Sessions 2-6.

Section 2: Improvements through workflow design: Lean & Six Sigma. Sessions 7-9.

Section 3: Improvements through inventory management: Supply Chain. Sessions 10-14.

Session 15 is for wrap-up and for sharing improvement stories.

## Course Materials

There is only one item *required* for purchasing: A Harvard course pack containing Harvard cases and readings that can be purchased through a link available on the class website (on Canvas). All other required materials (readings required for class participation, and practice questions & assignments) will be available on the class website. Presentation slides will be distributed at the beginning of each class session and will be posted on the class website.

The following text book for Operations Management is “strongly recommended” (but not required). The presentation of material in class is *not* synchronized with this book but readings from the books can be used as additional support for material covered in class.

G. Cachon, and C. Terwiesch. *Matching Supply with Demand*, 3<sup>rd</sup> edition, McGraw-Hill Irwin.

## Grading

	% of total grade
Four surveys (individual)	6%
Two homework quizzes (8%) + One midterm quiz (10%) (individual)	26%
Three assignments (group) (9+6+9%) (cases, game, articles)	24%
Participation (individual, in class and on discussion boards)	9%
Project (group)	10%
Final Exam (individual)	25%

For due dates, see the class schedule below.

Surveys are designed to make sure that you have regular occasions to review the material and test your understanding on simple questions. Surveys are meant to get you ready for the quizzes and prepare you for class discussions by checking that you have completed the required reading. Homework quizzes and the midterm quiz are meant to evaluate your understanding of the quantitative problems and some qualitative concepts covered in the class. Quizzes will prepare you for the final exam. They consist of numerical problems in multiple parts and are administered on Canvas. Two homework quizzes cover materials in sections 1 and 3. Midterm Quiz is meant to provide a midpoint check of your understanding of the material; it is a bit longer and has more weight. In addition to class sessions and help sessions, a summary-and-practice document available on Canvas will help you prepare for the quizzes.

A group assignment is due at the end of each of the three sections. After basic material is delivered in class and reinforced through surveys and quizzes, group assignments bring together all the models and ideas in that section and apply them to real cases and contexts. These assignments have open-ended questions and will be followed by class discussions of your responses; please be prepared to state and explain in class your work on assignments. Each group member should work on an assignment individually before combining the responses into one group submission.

Both individual and group work can have a discussion board component requesting you to post a brief summary of your ideas that others in the class can see and react to.

Participation grade depends on the quality of your participation and contributions to class discussions. To make this less subjective, we will count in-class votes and discussion board posts towards participation grade. Completing assigned readings before class, taking the initiative to think about your own examples of class concepts and sharing them with others (in class or on Canvas discussion boards) will increase your participation grade. Missing classes without sending me an email notice, being late to classes, and any use of phones/laptops in class that is not directly related to that session's material will decrease your participation grade.

Group Project is an opportunity to share your knowledge about a topic that you are interested in or passionate about with the rest of the class. I will work with the group through the quarter to find and connect your topic to the OM material we cover in the class. The deliverable is a slide deck and a video or presentation in the last session. Detailed information about this will be available in class.

The final exam is open-book, take-home, released soon after the last session and due in a week.

## **Availability of Help**

My phone number, email, and office hours are listed at the top. I am always happy to connect outside of office hours if you give me a short notice. I am usually quick in responding to emails; that is the best way to contact me at any time. Sometimes, I find it difficult to have an extended back-and-forth on email, and I might reply with my cell number and request you to call me. When a group is working on a project, I do like to get involved and find that a conference call works best. Scheduling phone calls on weekends is fine. I also plan to encourage the use of Zoom chat.

## **Academic Honesty and Expectations**

I employ the policies and procedures espoused by the Foster School of Business Honor Code to maintain academic integrity in the course. The Honor Code of the Foster School of Business expressly prohibits cheating, attempted cheating, plagiarism, and lying to administration or faculty as it pertains to academic work. Suspected violations of the Honor Code will be referred to the Foster Honor Council as outlined within the Honor Code.

As applied to this class, here are a few specific expectations. For individual work, you must not accept any help, and the final submission must be your own work. Please do not ask for or accept solutions from anybody else. For group assignments, it is expected that each member of the group has made an individual effort to address all questions and, in the end, each member is completely aware of the content in the submitted assignment. For case analysis, you must not search for material or look for answers on the Web; please analyze the case relying only on the information in the case and without any outside help. When you are in class, it is expected that you are not spending time and energy in activities (surfing, email, social networks) unrelated to the class material.

## **Preparation and Learning Experience**

The table on the next page lays out the topics we will cover in each session and due dates. Read/Prepare column shows what you should read before class (more details on the website). Here are a few things that will improve your learning experience.

- Complete the assigned reading (and think about it) before the class.
- Be in class on time; when in class, *engage* (focus, participate, share, advance the conversation).
- If there is any problem in understanding class material, ask for help as soon as possible.
- Take surveys/quizzes on time to reinforce what we did in class.
- Try practice problems; start assignments early.
- Work through cases and applications with an eye on takeaways.
- Think about related examples and share them with others (in class or online).

## **Religious Accommodations**

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Faculty Syllabus Guidelines and Resources. Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form available at <https://registrar.washington.edu/students/religious-accommodations-request/>.

## Class Schedule

(Details for each class along with links to readings will be available on the class website).

<b>SESSION DATE</b>	<b>TOPICS / CONCEPTS</b>	<b>READ/PREPARE BEFORE CLASS</b> (Except Harvard cases, all readings are available on the website.)	<b>DUE AT CLASS BEGINNING</b>
1. Wed 30-Sep	Introduction, Operation Strategy Flow, Elements, Metrics	Syllabus	Survey 1
<b><i>Section 1: Capacity &amp; Time</i></b>			
2. Mon 5-Oct	Process Capacity Focus, Fit, Bottlenecks	Economist (Shouldice)	
3. Wed 7-Oct	Balance & Flexibility Line balance, Util., WIP, Sizing	Tesla Video	Survey 2
4. Mon 12-Oct	Variability & Wait Times Measure, Wait, Reduce	Psychology of queues	
5. Wed 14-Oct	Capacity Pooling Design, Optimize, Pool	Pronto Pizza Grocery Line	Homework Quiz 1
6. Mon 19-Oct	Priority & Applications Schedule, Priority, Pricing	Baria case	Group Assignment 1
<b><i>Section 2: Lean &amp; Six Sigma</i></b>			
7. Wed 21-Oct	Waste / Value 7 Wastes, Setup, one-piece flow	Seven Wastes Video	
8. Mon 26-Oct	Stream and Pull Pull, Office, Software	Watch Styro Videos Continuous Software	Survey 3
9. Wed 28-Oct	Six Sigma DMAIC, Tools, Stories	UBER case	Group Assignment 2
<b><i>Section 3: Inventory &amp; Supply Chain</i></b>			
10. Mon 2-Nov	Service Level Optimization Inventory, Newsboy, Service level	Inventory Introduction	Mid-Term Quiz 2*
11. Wed 4-Nov	Total Logistics Cost Mismatch, Forecasting, Stocks	Zara	
12. Mon 9-Nov	Channel Fulfillment (Q,R), Pool, Omnichannel	Amazon case	Survey 4
13. Fri 13-Nov	Supply Chain Simulation Experience	Intro. To Simulation	Homework Quiz 3
14. Mon 16-Nov	Collaboration & Sourcing Info. Sharing, Contracts, Risks	Coda Coffee case	Group Assignment 3
15. Wed 18-Nov	Wrap-up & Improvement Stories Themes, Summary, Stories		Group Project
<p>*Mid-Term Quiz will be posted after Mon 19-Oct class and will be available for one week. Final Exam will be posted after Wed 18-Nov class and will be available for one week.</p>			

## Readings in the Harvard Course Pack

The cases in the Harvard Course Pack offer background information about Operations Management (OM) challenges in a variety of business contexts. Reading these cases before the course starts will help with terminology in early classes and with assignments later. If you are new to OM, reading these cases early will help you connect class concepts to real life. If you are already familiar with OM issues, reading these cases early will give you a head-start on assignments. Please read them in the following sequence.

1. Baria case: Discusses knowledge work, projects, software selling. Group Assignment 1 is based on this case. Sessions 5-6.
2. Continuous software development: Agile's successor. We will use this as background reading to show application of Lean to non-manufacturing contexts in Group Assignment 2. Sessions 8-9.
3. Innovation at UBER: The launch of Express Pool. We will use this as an example of data-driven process improvement & design of experiments in Six Sigma, and to start a discussion as part of Group Assignment 2. Session 9.
4. Amazon: Discusses retail, distribution, and fulfillment. We will use this as a background reading for inventory management issues, in Session 12 and for a question in Group Assignment 3.
5. Coda Coffee: Discusses sourcing and supply chain technology. We will use this in Session 14 and for a question in Group Assignment 3.

## Optional Readings:

We cover a broad range of material fast. Application examples are from a variety of areas, each with its own terminology for improvement concepts. My goal is to provide a streamlined version in the slides using them as connective tissue across examples from different industries. Textbooks tend to get too focused on a few areas and sometimes get into too much detail. That is why I do not *require* a textbook, hoping that the slides would be the most efficient way to deliver the material. That said, people learn in diverse ways, and some of you may prefer to read at length about a topic or want additional details. If so, I recommend the optional textbook listed below.

## Relevant Chapters and Pages from the Recommended Textbook

Please see the following chapters from the recommended textbook for additional support.

G. Cachon, and C. Terwiesch. *Matching Supply with Demand*, 3<sup>rd</sup> edition, McGraw-Hill Irwin.

Session 1: Chapter 1 Pages 4-6. Chapter 2 Pages 10-15.

Sessions 2-3: Chapter 3, Pages 32-43, 63-71.

Session 4: Chapter 8 Pages 144-163.

Session 5-6: Chapter 8 Pages 164-168, Chapter 9 183-191.

Session 7-9: Chapter 11.

Session 10: Chapter 12.

Session 11-12: Chapter 14-15.

Session 14: Chapter 17.