

The University of Pennsylvania
The Wharton School
Operations, Information, and Decisions Department (OIDD)

Spring 2024

OIDD 6110 - Operations Management: Quality and Productivity

I. Contact Information

Faculty
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II. Course Description

Matching supply with demand is an enormous challenge for firms: excess supply is too costly, inadequate supply irritates customers. In the course, we will explore how firms can better organize their operations so that they more effectively align their supply with the demand for their products and services. Throughout the course, I will illustrate mathematical analysis applied to real operational challenges – we seek rigor and relevance. My aim is to provide both tactical knowledge and high-level insights needed by general managers, management consultants, and entrepreneurs. We will see that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.

In OIDD6110, the emphasis is on the design of business processes to maximize productivity and achieve world-class quality. The course details different kinds of business processes and explains how to measure key process parameters like capacity and lead time. The course also covers process improvement and examines classic ideas in quality management.

III. Course Policy

This syllabus provides details on course policy and the schedule for OIDD6110. Students should read this material carefully at the start of the course.

IV. Grading

Each student's final numerical score for each course is based on the following items and weights:

- homework assignments (20%),

- class participation (20%),
- final exam (60%)

I add up the points from these grading ingredients to compute a total score. I then use the standard Wharton MBA grade distribution to translate the score into the final grades.

Homework assignments:

- There are two homework assignments for the course. The assignments are based on last year's final exam.
- Every homework question carries the same weight.
- All assignments must be submitted electronically through Canvas (you must press 'submit', it won't submit automatically). Students are responsible for checking that their assignment has been submitted.
- I recommend students to attempt to complete the assignments on their own. However, I encourage students within the same cohort to discuss and compare solution approaches. The main purpose of the homework is for you to learn.
- Partial credit is not given.
- If you want to use **AI tools** (such as chatGPT) for your homework assignments, you can do it, just say that you did at the end of the assignment: This has no impact on your grade, it is purely for descriptive statistics. I believe learning to use these AI tools will become an essential skill in many jobs in the future, so we better start using them to understand their potentials and limitations. However, you should be aware that chat GPT is unable to give correct answers to many of the questions you'll get in this course. Worse, it will give very plausible, yet wrong, answers. So, make sure you understand those answers. Using AI will not absolve you from understanding the problem at hand and being responsible for the answer you give! Some advice on how to use it:
 - The quality of the output is (also) a function of the effort you put in asking the question. Be specific, give context, and add details on what you want. Try again to improve.
 - Do not trust anything it says unless you have good reasons to believe it is correct.
 - If AI says it wants to be alive and marry you, be aware you are not the first person to be told so by it!
- You will not be allowed to use **AI tools** in the final exam.

Class attendance and participation:

- The class participation score is based on your contribution throughout the course. This includes coming to class (on time!), participating in class, case warmups (see below) and most of all, discussing cases. So, come to class prepared and be ready to defend your recommended course of actions!
- Case Warmup Assignments on Canvas: These are not graded. Completing them will grant a small amount of participation points, regardless of whether the answers are correct or not. Their purpose is twofold. They help you think about the case and get into the right mind frame (so make sure

you do them well if you want to get the most out of the case). And, they help me see how you think. I can use your answers for some (anonymized) examples to spark class discussion.

Final exam:

- There is a final exam based on the contents of the course: analytical tools, case discussions, lectures, etc.
- The exam will be on campus, in person, on April 19th from 3pm to 5pm.
- The format is open book and open notes.
- See point VI below for details regarding computer usage during the final
- You will not be allowed to use AI tools in the final exam.

V. Course Text, Readings and Handouts

All lectures will follow the textbook by Cachon and Terwiesch very closely. The relevant chapters for each session are listed later on in this document. Here is the reference of the textbook:

Cachon, G. P. & Terwiesch, C. Matching supply with demand: An introduction to operations management 4th Ed. Boston, MA: McGraw Hill.

We have also created a custom book that includes only the chapters of the textbook by Cachon and Terwiesch that are relevant for OIDD 6110. **This custom book can be purchased at the Penn bookstore**, and is based on the 4th edition of the textbook – differences with the 3rd edition on these selected chapters are negligible, in case you were wondering.

Cases are available via either Study.net or Canvas. All other course material (slides, etc) will be posted on Canvas.

Class recordings

Class recordings are a useful backup resource when a student cannot attend a class. If you cannot attend a class, you will get access to the video recording for that class. However, this is the only case in which class recordings will be shared. Knowing that all classes will be recorded and can be watched at any time sounds good in theory, but it undermines in-class attention and ultimately learning. For this reason, class recordings will not be shared for “review purpose” or any reason other than having been unable to attend a class.

VI. Use of Electronic Devices

The following states my policy with respect to the usage of electronic devices during class time and during the final exam.

In class: students are allowed to use tablets to take notes for the class (must lay flat). Laptops are allowed only for certain in-class activities (see last page) and are otherwise not allowed. Phones must be turned off.

In the final exam: Tablets and computers can be used to consult class slides and notes. They must turn off all wireless functionalities (wi-fi, bluetooth, etc.), and if in person, must lay flat at all times (e.g., Lenovo Yoga). No Excel or similar spreadsheet software can be used. Students should bring a calculator (this is all that is needed for the exam, really). Phones must be turned off.

VII. Ethics Matrix

	Materials							People				
OIDD 6110 Operations Management: Quality and Productivity	Approved calculator	Laptop / other electronics	Summary sheet	Current book / class notes	Past notes / summaries	Past exams / assignments	Internet content / other outside materials	Learning team / approved work team	Other student(s) in same section	Student(s) in other sections (same term)	Wharton student not taking the class this term	Person outside of Wharton
Homework	A	A	A	A	A	A	A	W ⁽¹⁾	W	W		
Cases	A	A		A				W ⁽²⁾	W	W		
Final Exam	A	L	A	A	A	A						
	A = Allowed material L = Allowed with limitations. See description Shaded Cell = Not allowed							W = Allowed to work together Shaded Cell = Not allowed				
Other comments:												
(1) Students are encouraged to test their understanding of the material by working on the homework individually. Once the student has diagnosed his/her skill level, communication is allowed and even encouraged (2) Students are strongly encouraged to collaborate on case preparation and discussion												
The information above covers many common situations but will not cover every circumstance. Remember: The Wharton MBA Code of Ethics that you accepted requires, among other things, that you represent yourself and your work honestly, don't try to gain unfair advantage over other students, follow the instructor's guidelines and respect confidentiality of your work and the work of others. Should you have questions, please contact your ethics liaison or professor.												

Legend: (*) Be ready to present, explain, and discuss your solutions. [L] You'll need your laptop!

Session #	Date	Lecture Topics, Cases, In-class Exercises, Readings
1	M, T; 3/11-12	In-class Exercise: Mortgage Processing; Introduction to Process Analysis 1/2 [L] Text: "1. Introduction", "3. Understanding the Supply Process" skip sect. 3.5 and 3.6.
2	W, Th; 3/13-14	Introduction to Process Analysis 2/2; Little's Law; Case: Paul Downs, and the Operations – Finance link (no assignment) Text: "2. The Process View" skip sect. 2.6. "6. The Link between Operations and Finance".
3	M, T; 3/18-19	Productivity metrics; In-class Exercise: Subway [L] Text: "4. Estimating and Reducing Labor Costs" sect. 4.1, 4.2, 4.3 only.
4	W, Th; 3/20-21	Process Design; Processes with Multiple Flow Units and Attrition Losses; [L] Text: "2. The Process View" sect. 2.6 only. "3. Understanding the Supply Process (sect. 3.5 and 3.6 only)"; "4. Estimating and Reducing Labor Costs" sect. 4.4 onward.
	Sa, 3/23	Due Date for Cranberry Case (by 11:59 pm EST)
5	M, T; 3/25-26	Case: National Cranberry (*)
6	W, Th; 3/27-28	Lean Operations; Quality Management, Six Sigma, and Control Charts Text 3 rd Ed: sect. 11.3 only "The Seven Sources of Waste", "10. Quality Management, SPC, and Six Sigma". Text 4 th Ed: "7. Quality and Statistical Process Control" skip computations in sect. 7.3; sect. 8.3 only "The Seven Sources of Waste".
	F, 3/29	Due Date for Homework 1 (by 11:59 pm EST)
	Sa, 3/30	Due Date for Capital One Case (by 11:59 pm EST)
7	M,T; 4/1-2	Case: Capital One (*) [L]
8	W, Th; 4/3-4	Managing Variability: Waiting Time Models Text 3 rd Ed: "8. Variability and its Impact... Waiting Time Problems" skip sect. 8.3. Text 4 th Ed: "9. Variability and its Impact..." skip sect. 9.3.
	Sa, 4/6	Due Date for Call Center Case (by 11:59 pm EST)
9	M,T; 4/8-9	Case: Call Center (*) [L]
10	W, Th; 4/10-11	In-class Exercise: Emergency Patients; Managing Variability: Throughput Loss Models; The Toyota Production System (TPS): Overview [L] Text 3 rd Ed: "9. The Impact of Variability on Process Performance: Throughput Losses". Text 4 th Ed: "10. The Impact of Variability on Process Performance: Throughput Losses".
	F, 4/12	Due Date for Homework 2 (by 11:59 pm EST)
	Sa, 4/13	Due Date for Toyota Case (by 11:59 pm EST)
11	M, T; 4/15-16	The Toyota Production System (TPS): Principles Case: Toyota Production System (*) Case: TPS implementation (no assignment) Text 3 rd Ed "11. Lean Operations and the Toyota Production System" skip sect. 11.3. Text 4 th Ed: "8. Lean Operations and the Toyota Production System" skip sect. 8.3.
12	W, Th; 4/17-18	Review Session (optional attendance)
	F, 4/19	FINAL EXAM, 3-5pm EST, on campus (classrooms to be assigned)