

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

**Note: this syllabus is from 2020: it contains only 10 classes, and is structured assuming mostly asynchronous teaching. The 2021 Spring course will have 12 sessions, with more than 50% of delivery synchronous. The syllabus for 2021 will be posted once ready.**

Spring 2020

**OID 611: 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, we illustrate mathematical analysis applied to real operational challenges – we seek rigor and relevance. Our aim is to provide both tactical knowledge and high-level insights needed by general managers and management consultants. We will demonstrate that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.

In OID 611, the emphasis is on the design of business processes to maximize productivity and to 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 OID 611. 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%),
- case deliverables and module quizzes (20%),
- final exam (60%)

We add up the points from these grading ingredients to compute a total score. We then compare this score with the scores of OID 611 students from the past two Spring semesters to translate the score into a final grade. Given the special circumstances from the CV outbreak, the limit of B+ to the average grade of this class has been removed.

*Homework assignments:*

- There are three 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).
- You are responsible for double checking that your assignment submission has been received. To check your status, return to the page from which you started the quiz and check the Sidebar (right) to see your assignment status: if you're only allowed one submission and you've submitted the assignment, you will see "Submission Details". This means that your solutions have been submitted. If instead you see "Resume Quiz", then your solutions have not been submitted.
- Each student must turn in his or her own assignment. We encourage students to attempt to complete the assignments on their own. However, to promote learning, students are allowed to discuss each assignment with other students in their cohort.
- Partial credit is not given. Please follow the format outlined in the homework.

*Case deliverables and module quizzes:*

- Some cases are discussed by me during lectures, require no prior preparation, and have no deliverables (e.g. Subway, Paul Downs). Other cases, marked with \* in the table at the end of this document, will be made available beforehand. For such cases, you will be asked to submit some deliverables: these may include things like answering questions and/or uploading attachments via Canvas.
- Module quizzes have a small weight on the final grade, their main purpose is for students to check their understanding of the material explained in the lectures.
- The content of all cases (in terms of lessons learnt/takeaways) may also be tested during the final exam.

*Final exam:*

- There is a final exam based on the contents of the course: analytical tools, case discussions, lectures, etc.
- The format of the final exam is open book and open notes.
- It is very likely that the final exam will be taken online. The exam will comprise of about 30-40 questions, each worth 1 point. There is not partial credit. More details on the exact format of the final exam will be communicated as the end of the course approaches.

## 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 4<sup>th</sup> Ed. Boston, MA: McGraw Hill.

The e-book version (example: Kindle) will not be permitted for use during the final exam, which is open book.

We have also created a custom book that includes only the chapters of the textbook by Cachon and Terwiesch that are relevant for OID 611. **This custom book can be purchased at the Penn bookstore**, and is based on the 3<sup>rd</sup> edition of the textbook – differences with the 4<sup>th</sup> edition on these selected chapters are negligible.

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

## VI. Use of Electronic Devices

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

In class: not relevant.

In the final exam: We allow the use of tablet computers under the condition that (a) they do not include any preprogrammed macros/excel files (b) they are not connected in any form to a network. Students are also allowed to use a calculator (this is all you need for the exam, really). Lap-tops are not allowed with the exception of lap-tops with tablet functionality (Lenovo Yoga, MS Surface, etc.). Such devices can be used only in tablet mode (no key-board). All phones must be turned off.

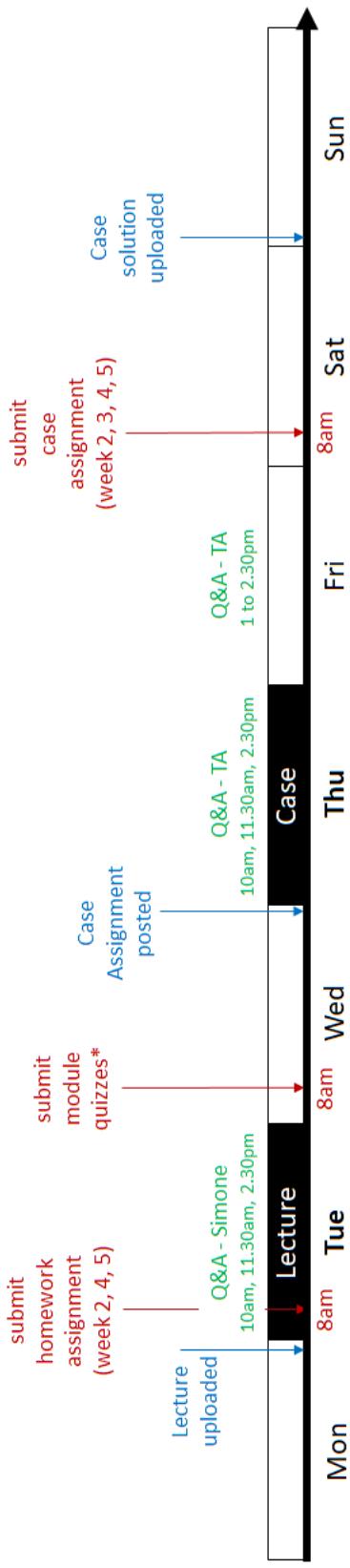
## VII. Ethics Matrix

OID 611 Operations Management: Quality and Productivity	Materials							People																	
	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				W <sup>(1)</sup>	W	W															
Cases	A	A		A				W <sup>(2)</sup>	W	W															
Final Exam	A <sup>(3)</sup>		A	A																					
	A = Allowed material Shaded Cell = Not allowed							W = Allowed to work together D = Discussion of general concepts and procedures is allowed but no sharing of specific answers. Shaded Cell = Not allowed																	
<b>Other comments:</b>		(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 (2) Students are encouraged to collaborate on the end-of-chapter problems (3) Laptop computers and devices with network capability are prohibited. Only calculators and tablets with no network access and no pre-programmed macros/excel files are allowed.																							
The information above covers many common situations but will not cover every circumstance. Remember: The <a href="#">Wharton MBA Code of Ethics</a> 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.																									

Session #	Date	Lecture Topics, Cases, Readings
1	T, 3/24	<b>Module 1: Introduction to Process Analysis</b> Text: “1. Introduction”, “2. The Process View”.
2	R, 3/26	<b>Module 2: Little’s Law; Module 3: Productivity metrics</b> <b>In-class case: Subway [L]</b> Text: “3. Understanding the Supply Process (except sections 3.5 and 3.6)”, “4. Estimating and Reducing Labor Costs”.
3	T, 3/31	<b>Module 4: Processes with Multiple Flow Units and Attrition Losses; [L]</b> <b>Case: Paul Downs, and the Operations – Finance link</b> Text: “3. Understanding the Supply Process (sections 3.5 and 3.6 only)”, “6. The Link between Operations and Finance”.
4	R, 4/2	<b>Case: National Cranberry (*)</b>
	<b>Su, 4/5</b>	<b>Due Date for Homework 1 (by 23.59 p.m. EST)</b>
5	T, 4/7	<b>Module 5: Quality Management, Six Sigma, Control Charts</b> <b>Module 6: Lean Operations</b> Text 3 <sup>rd</sup> Ed: Chapter 10 “Quality Management, SPC, and Six Sigma” (skip 10.7 and 10.8 and computations in 10.3 ad 10.4); section 11.3: The Seven Sources of Waste”. Text 4 <sup>th</sup> Ed: Chapter 7 (skip 7.5 and computations in 7.3); section 8.3 “The Seven Sources of Waste”.
6	R, 4/9	<b>Case: Capital One (*) [L]</b>
7	F, 4/14	<b>Module 7: Managing Variability: Waiting Time Models</b> Text 3 <sup>rd</sup> Ed: “8. Variability and its Impact on Process Performance: Waiting Time Problems (except section 3)”. Text 4 <sup>th</sup> Ed: Chapter 9 except 9.3.
8	R, 4/16	<b>Case: Call Center (*) [L]</b>
	<b>T, 4/21</b>	<b>Due Date for Homework 2 (by 8.00 a.m. EST)</b>
9	T, 4/21	<b>Module 8: Managing Variability: Throughput Loss Models</b> <b>Module 9: The Toyota Production System (TPS): Overview</b> Text 3 <sup>rd</sup> Ed: “9. Variability and its Impact on Process Performance: Throughput Losses”. Text 4 <sup>th</sup> Ed: Chapter 10.
10	R, 4/23	<b>Case: Toyota Production System (*)</b> <b>Case: TPS implementation</b> <b>Review Session</b> Text 3 <sup>rd</sup> Ed “11. Lean Operations and the Toyota Production System (except Section 3)”. Text 4 <sup>th</sup> Ed: Chapter 8 except 8.3.
	<b>T, 4/28</b>	<b>Due Date for Homework 3 (by 8.00 a.m. EST)</b>
	<b>R, 5/7</b>	<b>FINAL EXAM</b>

(\*) Read this case and submit the deliverables by the deadline (see Canvas). [L] Laptop needed

## A visual guide to OIDD611 with **deadlines**, **uploads**, and **Q&A times** (EST)



(\*) the recommended way to use module quizzes is to do them in between video lectures.