

**Sabancı PhD Program
Fall 2020****OPIM 613 Operations and Decision Analytics**

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Office Hours: By appointment. Please send me an e-mail letting me know the purpose of the meeting and alternative meeting times. I will respond to you by mail and send you the link for the meeting. Do not hesitate to email me when you have questions about the course.

Type	Time	Days	Where
Class	8:40 am - 10:30 am	Monday	Zoom
Class	8:40 am - 9:30 am	Tuesday	Asynchronous

Course Objective:

This course aims to provide the students with an overview of various research topics in operations management, such as inventory management, pricing and revenue management, service and retail operations, environmental issues and sustainability, healthcare operations and behavioural operations management. The students are expected to acquire an understanding of seminal and contemporary topics in operations management, and to build on this understanding to conceptualize valid research questions, which can be developed into academic papers.

Learning Outcomes:

By the end of this course, you will be able to:

- (1) Develop an understanding of the seminal and contemporary topics in operations management
- (2) Conceptualize and develop research questions related to operations management
- (3) Write and present academic papers

Course Material:

There is no textbook for this course; it will be based on analysis and discussion of academic papers. The list of these papers and the corresponding topics are provided under the section “Course Schedule and Readings” of the syllabus. I will post the readings on this list on SUCourse.

Course Web:

I will post the reading material, lecture slides, videos, deadlines, assignments, cancellations, postponements, links for the sessions, session recordings, in short, everything on SUCourse throughout the term. **Please check it frequently to see if new material has been placed.**

Note that Sabanci University uses a very powerful web-based tool called Turnitin. Turnitin is the worldwide standard in online plagiarism prevention. It allows instructors to compare student papers against a database composed of millions of articles. Every paper you submit will be scanned by Turnitin, and results will be reflected in your grades.

Instructional Design:

The instruction of this course will involve a combination of lecture material, discussion and presentations. In particular, students are expected to have read the assigned papers (marked as “discussion papers” in the reading list provided under “Course Schedule and Readings” section of the syllabus) and gone over the lecture slides (which I will post on SUCourse alongside the readings) before coming to class. During the class meeting, we will have a presentation paper (marked as “presentation paper” in the reading list provided under “Course Schedule and Readings” section of the syllabus), presented by one of the students, and discuss this paper, alongside other discussion papers. Students are expected to take an active role in class discussions.

Grading:

Deliverable	Due date	Grade percentage
Participation	Throughout the term	15%
Reflection papers	Throughout the term	15%
Presentations	Throughout the term	20%
Assignments	Throughout the term	10%
Research paper:		
Proposal	30 November	5%
Proposal presentation	30 November	5%
Final presentation	28 December	10%
Final report	18 January	20%
<i>TOTAL</i>		100%

Requirements:

Participation: As the course is based on the analysis and discussion of academic papers, students are expected to have read the assigned papers before coming to class and take an active role in class discussions. Note that, the papers which will be discussed in class, and hence, the students are expected to read before coming to class, are marked as “discussion papers” in the reading list provided under “Course Schedule and Readings” section of the syllabus. The students are also expected to come up with five discussion questions (in total) on the assigned readings before class, and submit these questions via SUCourse. The discussion questions can be about the research question, how the paper compares to the literature, the methodology, the insights, possible extensions etc. Feel free to come up with any question that you think is interesting, are curious about and would like to discuss with the others in class.

Reflection papers: After each class, I will provide you with a number of questions that will hopefully help you to reflect on the topics covered in class, and develop insights and potential research questions, and ask you to write a short (3-5 pages long) reflection paper on these questions. All reflection papers will be submitted via SUCourse.

Presentations: In each class, we will have a presentation paper (marked as “presentation paper” in the reading list provided under “Course Schedule and Readings” section of the syllabus). This paper will be presented by one of the students. Presentations should be approximately 25-30 minutes in length. I suggest using approximately 12-15 slides. The presentation should provide the following: (1) What are the main research questions of the paper? How does it relate and contribute to the existing literature? (2) Briefly describe the problem setting, and the methodology. What are the novel features of the setting and methodology? (note that some of the papers we read will use analytical models, some empirical analysis, and yet others methodologies such as laboratory experiments; hence, you should fit this part of the presentation to the particular methodology used) (3) What are the key insights from the paper? What are the key lessons that we learn from the paper? Which are surprising? Which contradict previous theories/models? (4) What directions are there for future research? How should this paper lead to additional work? (5) How can practitioners benefit from the insights provided in this paper? What are the managerial implications? Of course, it would not be possible to completely cover each of these points in 25-30 minutes; hence, the presenter should emphasize the points which are most relevant. Additionally, in some of the sessions, I will ask a student to cover a particular aspect of one of the discussion papers. This might be a particular theorem in the paper, a particular method of data analysis, or one aspect of an experiment. I will provide specific guidelines on the expectations. The student preparing this short

discussion should aim to take about 10-15 minutes of class. The students presenting should send their slides to me before the class via e-mail.

Assignments: We are going to have 3-4 assignments throughout the term that are designed to develop your critical thinking, and understanding of various topics in operations management. All assignments will be submitted via SUCourse.

Research paper: Each student will come up with an original research topic for a course paper which should relate to one of the topics we discuss in class. The basic idea for the paper is due on November 30. This proposal should be about 5-7 pages long, and needs to outline (1) your research question, (2) the motivation for this question (i.e., why is it a question worth exploring?), (3) a brief summary of literature that you will derive upon in your paper, (4) the method by which you propose to explore this topic. On the due date of the proposal, you should come to class prepared to discuss your idea, and how you plan to expand upon it, as we will discuss your ideas and provide feedback & suggestions. The second instalment of the research paper is the presentation (December 28). The presentation should include (1) an overview of your research problem and why this topic is relevant, (2) a summary of related literature and how your research relates to the previous literature, (3) a description of your methodology (if you are developing an analytical model, you should outline the decision variables, the model, the assumptions etc., with empirical research, you should introduce your data set and the statistical methods you propose to use, and with experimental research, you should provide the experimental design), (4) a description of the initial results, and a discussion of insights. The presentations should be about 10-15 minutes. The final report, which should provide the material in the presentation, plus the complete results, with a discussion of managerial insights, limitations and future research questions, is due on January 18. The slides for the presentations, and the proposal and final reports will be submitted through SUCourse.

Note that all deliverables are to be completed individually. However, academic research is based on collaboration and always improves when discussed with others. Hence, I encourage you to discuss whatever you are working on with others in the class and me.

Make up policy:

Because of the instructional design of the course, there can be no make up for missed participation, and presentations. If you cannot join a class, please let me know in advance, so we can work out a solution. All written assignments (research papers, reflection papers, assignments) should be submitted via SUCourse at the specified hour on the scheduled due date. Late submissions will not be accepted.

Academic Honesty:

Learning is enhanced through cooperation and as such you are encouraged to work in groups, ask for and give help freely in all appropriate settings. At the same time, as a matter of personal integrity, you should only represent your own work as yours. Any work that is submitted to be evaluated in this class should be an original piece of writing, presenting your ideas in your own words. Everything you borrow from books, articles, or web sites (including those in the syllabus) should be properly cited. Although you are encouraged to discuss your ideas with others (including your friends in the class), it is important that you do not share your writing (slides, MS Excel files, reports, etc.) with anyone. Using ideas, text and other intellectual property developed by someone else while claiming it is your original work is *plagiarism*. Copying from others or providing answers or information, written or oral, to others is *cheating*. Unauthorized help from another person or having someone else write one's paper or assignment is *collusion*. Cheating, plagiarism and collusion are serious offenses that could result in an F grade and disciplinary action. Please pay utmost attention to avoid such accusations.

Classroom Policies and Conduct:

Sabancı Business School PhD program values participatory learning. Establishing the necessary social order for a participatory learning environment requires that we all:

- Join the class prepared to make helpful comments and ask questions that facilitate our own understanding and that of our fellow participants. This requires that you complete the assigned readings for each session before class starts.
- Listen to the person who has the floor.
- Join the class on time.
- Laptops should only be used for class activities such as taking notes or referring to a paper.

You are expected to attend all class lectures, join on time, and stay for the entire session. If you have an excuse to miss an entire or a portion of a session, you should inform the instructor in advance. You are expected to participate in class discussions, answer and ask questions. These questions are intended to help you better understand the concepts and learn the mechanics of specific solutions approaches. Please note the importance of coming to classes prepared. Please refrain from activities that will distract other fellow students and the instructor. Cell phones should be shut off/muted before joining to class. Additionally, please turn your camera on at the beginning of the session (if, for any reason, it is not possible to do so, please inform the instructor before or during the session), and your microphone muted while others are speaking throughout the class.

Course Schedule and Readings:

The course topics and the papers for each class are given below. Note that papers are marked as discussion papers, presentation papers, further reading and lecture material. Discussion papers are the papers which will be discussed in class, and you are expected to read them and come up with discussion questions before coming to class. Presentation paper is the paper which will be presented by a student in that class. Further readings are papers which we will not discuss in class, but are related to the topic and can help in developing further understanding of the corresponding topic. Lecture material is the papers I will draw upon for the lecture slides I will post alongside the readings. You can skim them alongside the lecture presentation. We are not going to discuss these papers in detail, and they are meant to provide you with background material.

Week 1	Dates: October 5&6 Topic: Introduction
Week 2	Dates: October 12&13 Topic: <u>Basic Inventory Models</u> Arrow, K. J., Harris, T., & Marschak, J. (1951). Optimal inventory policy. <i>Econometrica: Journal of the Econometric Society</i> , 250-272. (<u>lecture material</u>) Clark, A. J., & Scarf, H. (1960). Optimal policies for a multi-echelon inventory problem. <i>Management science</i> , 6(4), 475-490. (<u>lecture material</u>) Chen, H., Frank, M. Z., & Wu, O. Q. (2005). What actually happened to the inventories of American companies between 1981 and 2000?. <i>Management science</i> , 51(7), 1015-1031. (<u>discussion paper</u>) Rumyantsev, S., & Netessine, S. (2007). What can be learned from classical inventory models? A cross-industry exploratory investigation. <i>Manufacturing & Service Operations Management</i> , 9(4), 409-429. (<u>discussion paper</u>)
Week 3	Dates: October 19&20 Topic: <u>Inventory Models: Data-Driven Inventory Models, Newsvendor with Pricing</u> Fisher, M. (2007). Strengthening the empirical base of operations management. <i>Manufacturing & Service Operations Management</i> , 9(4), 368-382. (<u>lecture material</u>) Ban, G. Y., & Rudin, C. (2019). The big data newsvendor:

Practical insights from machine learning. *Operations Research*, 67(1), 90-108." ([presentation paper & discussion paper](#))

Kocabıyıkoglu, A., & Popescu, I. (2011). An elasticity approach to the newsvendor with price-sensitive demand. *Operations research*, 59(2), 301-312. ([discussion paper](#))

Agrawal, V., & Seshadri, S. (2000). Impact of uncertainty and risk aversion on price and order quantity in the newsvendor problem. *Manufacturing & Service Operations Management*, 2(4), 410-423. ([further reading](#))

Week 4

Dates: October 26&27

Topic: Supply Chain Management

Lariviere, M. A., & Porteus, E. L. (2001). Selling to the newsvendor: An analysis of price-only contracts. *Manufacturing & service operations management*, 3(4), 293-305. ([lecture material](#))

Cachon, G. P., & Lariviere, M. A. (2005). Supply chain coordination with revenue-sharing contracts: strengths and limitations. *Management science*, 51(1), 30-44. ([lecture material](#))

Cachon, G. P. (2003). Supply chain coordination with contracts. *Handbooks in operations research and management science*, 11, 227-339. ([lecture material](#))

Lee, H. L., Padmanabhan, V., & Whang, S. (1997). The bullwhip effect in supply chains. *Sloan management review*, 38, 93-102. ([discussion paper](#))

Lee, H. L., Padmanabhan, V., & Whang, S. (1997). Information distortion in a supply chain: The bullwhip effect. *Management science*, 43(4), 546-558. ([presentation paper & discussion paper](#))

Cachon, G. P. (2004). The allocation of inventory risk in a supply chain: Push, pull, and advance-purchase discount contracts. *Management Science*, 50(2), 222-238. ([discussion paper](#))

de Kok, T., Janssen, F., Van Doremalen, J., Van Wachem, E., Clerkx, M., & Peeters, W. (2005). Philips electronics synchronizes its supply chain to end the bullwhip effect. *Interfaces*, 35(1), 37-48. ([further reading](#))

Malik, Y., Niemeyer, A., & Ruwadi, B. (2011). Building the

supply chain of the future. *TMI-Treasury Management International*, 83, 21. ([further reading](#))

Week 5

Dates: November 2&3

Topic: Retail Operations

Ryzin, G. V., & Mahajan, S. (1999). On the relationship between inventory costs and variety benefits in retail assortments. *Management Science*, 45(11), 1496-1509. ([discussion paper](#))

Bernstein, F., Kök, A. G., & Xie, L. (2015). Dynamic assortment customization with limited inventories. *Manufacturing & Service Operations Management*, 17(4), 538-553. ([presentation paper](#) & [discussion paper](#))

Bernstein, F., & Martínez-de-Albéniz, V. (2017). Dynamic product rotation in the presence of strategic customers. *Management Science*, 63(7), 2092-2107. ([discussion paper](#))

Acimovic, J., & Graves, S. C. (2015). Making better fulfillment decisions on the fly in an online retail environment. *Manufacturing & Service Operations Management*, 17(1), 34-51. ([discussion paper](#))

Bell, D. R., Gallino, S., & Moreno, A. (2014). How to win in an omnichannel world. *MIT Sloan Management Review*, 56(1), 45. ([further reading](#))

Week 6

Dates: November 9&10

Topic: Service Operations

Aksin, Z., Armony, M., & Mehrotra, V. (2007). The modern call center: A multi-disciplinary perspective on operations management research. *Production and operations management*, 16(6), 665-688. ([lecture material](#))

Gans, N., Koole, G., & Mandelbaum, A. (2003). Telephone call centers: Tutorial, review, and research prospects. *Manufacturing & Service Operations Management*, 5(2), 79-141. ([lecture material](#))

Tan, T. F., & Netessine, S. (2014). When does the devil make work? An empirical study of the impact of workload on worker productivity. *Management Science*, 60(6), 1574-1593. ([presentation paper](#) & [discussion paper](#))

Ülkü, S., Hydock, C., & Cui, S. (2019). Making the wait

worthwhile: Experiments on the effect of queueing on consumption. *Management Science*. ([discussion paper](#))
Frei, F. X. (2006). Breaking the trade-off between efficiency and service. *Harvard business review*, 84(11), 92. ([discussion paper](#))
Tan, T. F., & Netessine, S. (2019). When you work with a superman, will you also fly? an empirical study of the impact of coworkers on performance. *Management Science*, 65(8), 3495-3517. ([further reading](#))

Week 7

Dates: **November 16&17**

Topic: **Revenue Management**

Weatherford, L. R., & Bodily, S. E. (1992). A taxonomy and research overview of perishable-asset revenue management: Yield management, overbooking, and pricing. *Operations research*, 40(5), 831-844. ([lecture material](#))
Belobaba, P. P. (1989). OR practice—application of a probabilistic decision model to airline seat inventory control. *Operations Research*, 37(2), 183-197. ([lecture material](#))
Gallego, G., & Van Ryzin, G. (1994). Optimal dynamic pricing of inventories with stochastic demand over finite horizons. *Management science*, 40(8), 999-1020. ([presentation paper](#) & [discussion paper](#))
Kocabiyikoğlu, A., Popescu, I., & Stefanescu, C. (2014). Pricing and revenue management: The value of coordination. *Management Science*, 60(3), 730-752. ([discussion paper](#))

Week 8

Dates: **November 23&24**

Topic: **Revenue Management**

Ferreira, K. J., Lee, B. H. A., & Simchi-Levi, D. (2016). Analytics for an online retailer: Demand forecasting and price optimization. *Manufacturing & Service Operations Management*, 18(1), 69-88. ([presentation paper](#) & [discussion paper](#))
Tereyağoğlu, N., Fader, P. S., & Veeraraghavan, S. (2017). Pricing theater seats: The value of price commitment and monotone discounting. *Production and Operations Management*, 26(6), 1056-1075. ([discussion paper](#))
Caro, F., & Gallien, J. (2012). Clearance pricing optimization for a fast-fashion retailer. *Operations Research*, 60(6), 1404-1422. ([discussion paper](#))

Vulcano, G., Van Ryzin, G., & Char, W. (2010). Om practice—choice-based revenue management: An empirical study of estimation and optimization. *Manufacturing & Service Operations Management*, 12(3), 371-392. ([further reading](#))

Week 9 **Dates:** **November 30 & December 1**

Topic: **Research paper proposals**

Week 10 **Dates:** **December 7 & 8**

Topic: **Behavioural Operations Management**

Schweitzer, M. E., & Cachon, G. P. (2000). Decision bias in the newsvendor problem with a known demand distribution: Experimental evidence. *Management Science*, 46(3), 404-420. ([lecture material](#))

Katok, E., & Wu, D. Y. (2009). Contracting in supply chains: A laboratory investigation. *Management Science*, 55(12), 1953-1968. ([presentation paper](#) & [discussion paper](#))

Ren, Y., & Croson, R. (2013). Overconfidence in newsvendor orders: An experimental study. *Management Science*, 59(11), 2502-2517. ([discussion paper](#))

Ramachandran, K., Tereyağoğlu, N., & Xia, Y. (2018). Multidimensional decision making in operations: An experimental investigation of joint pricing and quantity decisions. *Management Science*, 64(12), 5544-5558. ([discussion paper](#))

Kocabiyikoglu, A., Gogus, C. I., & Gonul, M. S. (2015). Revenue management vs. newsvendor decisions: Does behavioral response mirror normative equivalence?. *Production and Operations Management*, 24(5), 750-761. ([discussion paper](#))

Shunko, M., Niederhoff, J., & Rosokha, Y. (2018). Humans are not machines: The behavioral impact of queueing design on service time. *Management Science*, 64(1), 453-473. ([further reading](#))

Week 11 **Dates:** **December 14&15**

Healthcare Operations

Green, L. V. (2012). OM forum—The vital role of operations analysis in improving healthcare delivery. *Manufacturing & Service Operations Management*, 14(4), 488-494. ([lecture material](#))

Rais, A., & Viana, A. (2011). Operations research in healthcare: a survey. *International transactions in operational research*, 18(1), 1-31. ([lecture material](#))

Batt, R. J., & Terwiesch, C. (2017). Early task initiation and other load-adaptive mechanisms in the emergency department. *Management Science*, 63(11), 3531-3551.

([presentation paper](#) & [discussion paper](#))

Deo, S., & Sohoni, M. (2015). Optimal decentralization of early infant diagnosis of HIV in resource-limited settings. *Manufacturing & Service Operations Management*, 17(2), 191-207. ([discussion paper](#))

Green, L. V., Savin, S., & Savva, N. (2013). “Nurse-vendor problem”: Personnel staffing in the presence of endogenous absenteeism. *Management Science*, 59(10), 2237-2256.

([discussion paper](#))

Alagoz, O., Maillart, L. M., Schaefer, A. J., & Roberts, M. S. (2004). The optimal timing of living-donor liver transplantation. *Management Science*, 50(10), 1420-1430.

([further reading](#))

Week 12

Dates: December 21&22

Topic: Sustainable Operations

Drake, D. F., & Spinler, S. (2013). OM forum—sustainable operations management: an enduring stream or a passing fancy?. *Manufacturing & Service Operations Management*, 15(4), 689-700. ([lecture material](#))

Corbett, C. J., & Kleindorfer, P. R. (2001). Environmental management and operations management: Introduction to part 1 (manufacturing and ecologistics). *Production and Operations Management*, 10(2), 107-111. ([lecture material](#))

Corbett, C. J., & Kleindorfer, P. R. (2001). Environmental management and operations: Introduction to part 2 (integrating operations and environmental management systems). *Production and Operations Management*, 10(3), 225. ([lecture material](#))

Kabra, A., Belavina, E., & Girotra, K. (2019). Bike-share systems: Accessibility and availability. *Management Science*. ([presentation paper](#) & [discussion paper](#))

Cohen, M. C., Lobel, R., & Perakis, G. (2016). The impact of demand uncertainty on consumer subsidies for green technology adoption. *Management Science*, 62(5), 1235-1258. ([discussion paper](#))

Cachon, G. P. (2014). Retail store density and the cost of greenhouse gas emissions. *Management Science*, 60(8), 1907-1925. ([discussion paper](#))

Week 13 **Dates: December 28&29**
Final presentations

Week 14 **Dates: January 4&5**
Review and wrap up

Cachon, G. P. (2012). What is interesting in operations management?. *Manufacturing & Service Operations Management*, 14(2), 166-169. (discussion paper)
