Sabancı PhD Program
Fall 2021
OPIM 611 – Modeling in Operations Management

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Type	Time	Days	Where
Class	13:40 − 16:30	Monday	SBS G062

Course Objective:
This course aims to introduce the students to the conceptual frameworks and models of operations management and the techniques to find the best solutions to these models. Upon completion of this course, the students are expected to analyze complex supply chain systems, build mathematical models for these systems, and find the best policies to operate these systems. Several inventory settings and pricing and game-theoretic models will be analyzed in a supply chain setting, and their solution methods will be discussed.

Learning Outcomes:
Upon successful completion of the course, the student should be able to:
1. Understand quantitative modeling and analysis of complex supply chain problems.
2. Develop mathematical formulations of inventory and pricing problems in deterministic and stochastic settings.
3. Build solution approaches to determine the best solutions to inventory and pricing problems in deterministic and stochastic settings.
4. Develop game-theoretic models in the operations management framework, and construct solution approaches to investigate the optimal behaviors of the agents.

Course Material:
The course will largely be conducted using lecture notes. The following books will be used as reference:
1. Zipkin, P. (2000) *Foundations of Inventory Management.* McGraw-Hill, New York.
2. Porteus, E. L. (2002) *Foundations of Stochastic Inventory Theory.* Stanford University Press, Stanford.
3. Silver, E. A., Pyke, D. F., and Peterson R. (1998) *Inventory Management and Production Planning and Scheduling.* John Wiley and Sons.
4. Hadley, G. F., and Whitin, T. M. (1963) *Analysis of Inventory Systems.* Prentice-Hall, Englewood Cliffs.

Course Web:
I will post the deadlines, assignments, cancellations, postponements, in short, everything on SUCourse+ throughout the term. **Please check it frequently to see if new material has been placed.**

Note that Sabancı 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 class time will be devoted to lectures and discussion of the course topics.

Grading:

Deliverable	Grade percentage
Homework	15%
Project	20%
Midterm Exam	25%
Final Exam	40%
Total	100%

Requirements:
General requirements regarding the grading items listed above are as follows:

1) Homework: To reinforce the course topics, I will regularly assign homework problems. The main goals of these assignments are to expose students to more complex problems and understanding of the theory and evaluate their abilities and knowledge. Therefore, students should devote considerable time to the assignments. Each assignment should be submitted before the due date and time.

2) Project: The goal of the project is to motivate the involvement of the students with supply chain problems and techniques beyond the lecture contents. The project will be done in groups of at most two.

Each group will come up with a research topic for the project that should relate to one of the topics we cover. The project includes:
1) ***Project Proposal (maximum 3 pages):*** You must elaborate on the topic that you study in the project. In particular, your report should embrace the following sections:
    i. *Introduction*: Why is this topic important? What do you want to analyze in this project?
    ii. *Literature Review*: How does your project relate to the previous literature?

The project proposal will be due mid-course.

2) ***Final Report (maximum 15 pages):*** The final report should include the following sections:
   i. *Introduction*: you should present an overview of the research problem. You should motivate your research through the lenses of both practice and academia.
   ii. *Literature review*: you should present a summary of the related literature. How does your research contribute to the relevant literature?
   iii. *Description of the model*: you should present a mathematical model that addresses your research questions. Besides, you should include the discussions of the following components in detail:
      - What are the significant factors and decision variables?
      - What assumptions does your model make?
   iv. *Initial results:* describe your preliminary results. Are these results intuitive? Why are they important?
   v. *Conclusion:* you must provide an overview of your project together with the initial results.
   vi. *References*

The last week of the semester will include presentations of the course project. The final report should be submitted at the end of the semester.

3) Midterm Exam: Midterm exam will take place on week 7 and will be on topics we have covered until that date. This exam will be closed book and closed notes. The exam will include problem solving type of questions.
Date: **November 8.**

4) Final Exam: This exam will cover topics we have covered until the end of the semester. This exam will be a closed book and closed notes. The exam will include the problem-solving type of questions. *Eligibility for the final exam*:
   a. Having a grade from the midterm exam (unless you have a proven medical excuse),
   b. Obtaining at least 25% of the midterm and homework assignments in total, corresponding to 10% of the course grade,
   c. Taking part in the course project.
Date: **Final exam period**.

Make up policy: If you cannot take a midterm due to a documented health problem, or a similar issue, you should contact the instructor **before** the exam. There will be **no make-up** for missed class participation and homework. All written assignments should be submitted at the indicated 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 PhD Program values participatory learning. Establishing the necessary social order for a participatory learning environment requires that we all:
- Come prepared to make helpful comments and ask questions that facilitate your own understanding and that of your classmates. This requires that you complete the assigned readings for each session before class starts.
- Listen to the person who has the floor.
- Come to class on time.
- If you use your laptop during class, it is only to be used for class activities such as taking notes or referring to a spread sheet. You are not to connect the laptop to the network and should not be doing any non-class activities during class time. Laptop usage may be forbidden if it is abused or if it distracts the professor or other students.

You are expected to attend all class lectures, arrive on time, and stay in class 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 coming to class.

Course Schedule:

Week 1	Dates:	September 27
	Topic:	*Deterministic Inventory Models*
Week 2	Dates:	October 4
	Topic:	*Deterministic Inventory Models*
Week 3	Dates:	October 11
	Topic:	*Supply Chain Coordination and Contracting*
Week 4	Dates:	October 18
	Topic:	*Supply Chain Coordination and Contracting*
Week 5	Dates:	October 25
	Topic:	*Stochastic Single Period Inventory Models*
Week 6	Dates:	November 1
	Topic:	*Stochastic Single Period Inventory Models*
Week 7	Dates:	November 8
	Topic:	**Midterm Examination**
Week 8	Dates:	November 15
	Topic:	*Inventory and Pricing Games in Supply Chains*
Week 9	Dates:	November 22
	Topic:	*Inventory and Pricing Games in Supply Chains*
Week 10	Dates:	November 29
	Topic:	*Inventory and Pricing Games in Supply Chains*
Week 11	Dates:	December 6
	Topic:	*Multi-Period Inventory Models*
Week 12	Dates:	December 13
	Topic:	*Multi-Period Inventory Models*
Week 13	Dates:	December 20
	Topic:	*Retailing*
Week 14	Dates:	December 27
	Topic:	*Project Presentations*