

D-Lab
Sloan School of Management
EC.733J, 15.772J, 2.871

Professor S. C. Graves
Dr. Jarrod Goentzel
Spring 2021

D-Lab: Supply Chains

COURSE OUTLINE AND ASSIGNMENTS

Course Description: Introduces concepts of supply chain design and planning with a focus on supply chains for products destined to improve quality of life in developing countries. Topics include demand estimation, process analysis and improvement, facility location and capacity planning, inventory management, and supply chain coordination. Also covers issues specific to emerging markets, such as sustainable supply chains, choice of distribution channels, and how to account for the value-adding role of a supply chain. Students conduct D-Lab-based projects on supply chain design or improvement.

Units: 3-3-6

Lecture: Mon Wed 9:30 – 11:00

Room: 32 - 141

Class will be a mix of lectures, experiential games and cases. The course objectives are to develop an understanding of the challenges in the design and planning of supply chains, and to learn modeling skills and problem-solving tools, applicable to the design and planning of supply chains. Students conduct projects related to the improvement of an existing supply chain, or the design (or scaling) of a new supply chain in a developing economy.

Course requirements are to come to class prepared, and to participate in the class. There will be a number of individual assignments throughout the class and a group project. The grading will depend on the assignments, contribution to the class and project. I am expecting that most of the class material will be available from Study.net, which you will access from the Canvas site. . ***We do ask that you buy and read The Goal: A Process of Ongoing Improvement***, by Goldratt et al. ***There are 3 editions – the first version is the best but any version is fine for our purposes.***

The following books are useful references:

Simchi-Levi, Kaminsky and Simchi-Levi, Designing and Managing the Supply Chain, Irwin McGraw Hill, 3rd edition, 2008.

Hopp and Spearman, Factory Physics, 3rd edition, Waveland Press, 2011.

Hopp, Supply Chain Science, McGraw-Hill/Irwin, 2008.

Nahmias and Olsen, Production and Operations Analysis, 7th edition, Waveland Press, 2015.

Chopra and Meindl, Supply Chain Management, Pearson, 6th edition 2015.

Silver, Pyke, Peterson, Inventory Management and Production Planning and Scheduling, Wiley, 3rd edition, 1998.

Snyder and Chen, Fundamentals of Supply Chain Theory, 2nd edition, Wiley, 2019.

Vandeput, Inventory Optimization: Models and Simulations. Walter de Gruyter GmbH & Co KG, 2020.

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Office Hours: I will plan to have these each week by Zoom, on Friday AM or possibly Thursday AM.

Calendar

			D-Lab: Supply Chain	Notes
1	W 1	Feb. 17	Introduction and Course Overview; Supply Chain Challenges	Students should start reading “The Goal”
2	W2	Feb. 22	Supply Chain Dynamics: Beer Game We will conduct a supply chain simulation virtually	Write-up of SC example due
3	W2	Feb. 24	Supply Chain Dynamics; Beer Game debrief We’ll spend remaining half the class reviewing the possible candidates for your term projects. We’ll initiate process to form groups and match to projects	Beer game report due
4	W3	Mar. 1	Demand Management and Forecasting (start)	
5	W3	Mar. 3	Demand Management and Forecasting (finish)	Problem Set 1 assigned
6	W4	Mar. 9 (TU)	Capacity Planning and Production Flow Control Preparation: Read Chapters 1 to 31 of The Goal and be prepared to discuss	Report on “The Goal” due
7	W4	Mar. 10	Process Analysis Case Discussion: Kristen’s Cookie Company To help prepare the case, students should read “XTM Bike Corporation: An exercise in process analysis”	Case preparation
	W4	TBD	<i>Recitation/office hours on forecasting</i>	
8	W5	Mar. 15	Students will make presentations on projects: (i) background for enterprise; (ii) what’s its goal? (iii) what’s the problem? (iv) And what’s the plan to address?	Problem set 1 due
9	W5	Mar. 17	Process analysis: Case Discussion: University Health Service	Case preparation
	W6	Mar. 22	Holiday	
10	W6	Mar. 24	Aggregate Planning Case discussion: Cataumet Boats	Case preparation Problem set 2 assigned
	W6	TBD	<i>Project update 1</i>	
11	W7	Mar. 29	Process analysis We will conduct a simulated hands-on line design exercise.	
12	W7	Mar. 31	Supply chain planning Case discussion: A perfect storm: Examining the supply chain for N95 masks during covid-19	Case preparation
		TBD	<i>Recitation/office hours: Capacity planning</i>	
13	W8	Apr. 5	Inventory models I	Problem set 2 due

14	W8	Apr. 7	Inventory models II	
	W8	TBD	<i>Project update 2</i>	
15	W9	Apr. 12	Inventory Management Case discussion: Scientific Glass Inc.	Case preparation Problem set 3 assigned
16	W9	Apr. 14	Supply Chain Contracts	
	W10	Apr. 19	Holiday	
17	W10	Apr. 21	Lean Production System and Quality Management In preparation for class watch: Jiro Dreams of Sushi ; and read assigned readings on TPS	Jiro Dreams of Sushi report due
		TBD	<i>Recitation/office hours: Inventory management</i>	
18	W11	Apr. 26	Lean Process Improvements & Value Stream Mapping Case Discussion : Lean Process Improvements at Cleveland Clinic To help prepare the case, students should read posted material on value stream mapping	Case preparation
19	W11	Apr. 28	Service Excellence Case Discussion: The Dabbawala System	Case preparation Problem set 3 due
		TBD	<i>Project update 3</i>	
20	W12	May 3	Supply Chain Procurement Case Discussion : Developing UNICEF's RUTF Global Supply Network	Case preparation
21	W12	May 5	NO CLASS: Optional individual meetings	
22	W13	May 10	Supply Chain game In-class/virtual exercise: bring lap top	Review game instructions prior to class
23	W13	May 12	Supply Chain Game Debrief	Game Report Due
		TBD	<i>Project update 4 & D-Lab Student Showcase (?)</i>	
24	W14	May 17	Project presentations	
25	W14	May 19	Project presentations and Class wrap	

Course Requirements:

This is a twelve-unit class: three hours each week will be spent in class, and the remaining nine hours will be split between group work on assignments and your term project and individual work on readings, class preparation and assignments. Students should submit any written assignments electronically or in hard copy before the beginning of the class on the day that it is due. If you anticipate problems handing in an assignment on time, contact the instructor in advance; any unexcused late submissions will result in a grade reduction.

We expect all students to attend all classes. If you cannot attend a particular class session, you should contact the instructor prior to the class. More than two unexcused absences will result in a grade reduction.

More specifically, there are the following assignments with their grade weights:

- Three problem sets (forecasting; capacity planning and process analysis; inventory, contracts and procurement); these can be done individually or in two-student groups. (30%)
- Four individual one-page write-ups (SC example; Beer Game; The Goal; Jiro Dreams of Sushi). (10%)
- One-page case write-ups (Kristen cookie; University health service; Cataumet Boats; Scientific Glass Inc; Supply Chain for N95 Masks; Dabbawala; RUTF Global Supply Network); these are to be done individually. Students can choose which cases to do. (20%)
- Students enrolled in 15.772J are to do TWO case write-ups. (i.e, 2 out of 7 cases)
- Students enrolled in 2.871 are to do FOUR case write-ups. (i.e, 4 out of 7 cases)
- Group project (35%)

The remaining 5% is based on class engagement. Each of the *individual write-ups* should be at most 500 words.

The grading standards for graduate credit (2.871) may differ from that for undergraduate credit (15.772J).

For your term project, the intent is to study an existing or prospective supply chain for a D-Lab product or technology, or something comparable in intent and spirit. There is no single template for this project. Nevertheless, each project should think about the following questions:

- What are the primary objectives and key performance measures for this supply chain?
- What are the key challenges or issues in matching supply to demand for this supply chain? How would you characterize these as related to the material covered in the class?
- How might one address these challenges, both in terms of the design of the supply chain, as well as supply chain planning and execution?
- What are the implementation steps for either setting up or improving the supply chain?

We will initiate the projects in the first month of the term, then have regular, scheduled check-ins on your progress, and expect your **final presentation** and a **paper** in the last week. There are no strict requirements on the paper other than it provide a comprehensive report and documentation of your work. You should write the report as a deliverable for the project sponsor. For past projects, five to ten pages has been sufficient, along with exhibits.

Academic Honesty

The rules of the MIT Faculty state: "The attempt of any student to present as his or her own the work of another, or any work which he or she has not honestly performed, or to pass any examination by improper means, is regarded by the Faculty as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is likewise held to be a great breach of discipline."

In the context of this class, we have both individual and group assignments. In either case, the intent is that you, as an individual or as a group, work independently of other individuals or groups. Nevertheless, at times, you may get stuck and you may then wish to consult with others, including the instructors; this is fine as long as you fully acknowledge this consultation as part of your assignment submission.

If you are uncertain about any aspect or instance of this policy, please ask one of the instructors for clarification.

MITx:

For our sessions on forecasting and basic inventory models, we will use some content from an online class offered through MITx. To get access to this material, please go to

https://lms.mitx.mit.edu/courses/course-v1:MITx+15.772jr+2021_Spring/course/

From this link you will 'enroll' in an (ad hoc) MITx class that was set up for this purpose.

We will provide updates for what to watch and when, as the class proceeds.