

B8108.060 Supply Chain Management for MSE

Instructor: Awi Federgruen
Office: 419 Uris Hall
Tel: 212-854-6084
Email: af7@columbia.edu

TA office hours: TBA

This course covers the major issues in supply chain management, including the definition of supply chain, planning models to guide the design of a supply chain network, the role of inventories in make to stock systems, commonly used inventory models, supply contracts, the value of information and information sharing, risk pooling, design for postponement, managing product variety, information technology and supply chain management; international and environmental issues.

Prerequisites:

- IEOR 3402, IEOR 4000 or permission of instructor
- Students are expected to have a working knowledge of optimization, spreadsheet based simulation, probability and EXCEL.

Required Textbook: David Simchi-Levi et al., *Designing and Managing the Supply Chain: Concepts, Strategies, and Test Studies*. 3rd edition, McGraw-Hill, 2007.

Readings & Cases (available on Courseworks website):

- CEMEX: Transforming a Basic Industry Company
- Fast, Global, and Entrepreneurial: Supply Chain Management, Hong Kong Style (An interview with Victor Fung)
- Multimarket Facility Network Design with Offshoring Applications
- Queuing Management and Models
- Dynamic Lot Sizing with Deterministic Demand, Principles of Inventory Management

Recommended References:

- Jeremy F. Schapiro, *Modeling the Supply Chain*. Duxbury, 2001.
- Terry P. Harrison et al., eds., *The Practice of Supply Chain Management: Where Theory and Application Converge*. Kluwer Academic Publishers, 2003.
- Sunil Chopra and Peter Meindl, *Supply Chain Management: Strategy, Planning, and Operation*. 2nd edition, Pearson Prentice Hall, 2004.
- Gérard Cachon and Christian Terwiesch, *Matching Supply with Demand: An Introduction to Operations Management*. McGraw Hill, 2009.

- Robert E. Hall, *Digital Dealing: How E-Markets are Transforming the Economy*. W.W. Norton & Company, 2001.
- A.G. de Kok and S.C. Graves. Eds., *Supply Chain Management: Design, Coordination, and Operation*. Elsevier, 2003.

Game Assignment: Write-up Littlefield game (group assignment), due March 6 (5% grade)

Problem Assignments (You must turn in at least 6; you will be credited for the best 6 grades):

1. Problem set 1: Deterministic continuous review models, due Feb 11
2. Problem set 2: Single period stochastic inventory problems, due Feb 18
3. Sports Obermeyer analysis, due Feb 20
4. Problem set 3: Make to order systems, due March 4
5. Problem set 4: Supply contracts, due March 11
6. Problem set 5: Multi-period stochastic inventory models, due March 25
7. Problem set 6: Multi-period non-stationary models, due April 8
8. Problem set 7: Inventory pooling, due April 15
9. Problem set 8: Network design problems, due April 29

Grading:	Problem Sets	30%
	Final Exam	30%
	Midterm Exam	25%
	Littlefield game write-up (group assignment)	5%
	Participation	10%

Participation: For this course to be successful, everyone must participate in classroom discussion. The participation grade is based on the instructor's evaluation of the quality of each student's progress and contribution during the semester. You should note that, in general, *quality* is more important than *quantity*.

Make-Up Exams: The instructor requires written documentation of the student's reason for missing the exam, as well as notification prior to the scheduled exam. If the instructor decides that the reason for the absence is valid, the student will be scheduled for the make-up exam.

Re-Grading: If you feel that your performance has been under-evaluated, please resubmit your work, along with a *written* statement directly to the course instructor, within seven days after receiving your grades, explaining clearly why you feel that your grade should be adjusted.

Tentative schedule :

Jan 30: Introduction to Supply Chain Management

Feb 4 - Feb 6: Introduction to inventory management: Deterministic Continuous Review models

Feb 11 - Feb 13: Managing Demand risks; Supply Contracts (Single sales season models)

Feb 18: Make to Order systems: queueing models

Feb 20: The value of reactive capacity: Sports Obermeyer case

Feb 25 - Feb 27: Multi-period inventory systems: linear procurement costs; the role of forecasting in supply chain management

March 4: Multi-period inventory models: economies of scale in procurement costs

March 6: Littlefield supply chain game: discussion and analysis

March 11: Serial supply chains and the bull whip effect: **an in-class Beer Game (longer session 8:30AM-10:30AM)**

Friday, March 15: Midterm (9AM -11AM, Warren 208)

March 18-22: SPRING BREAK

March 25 : The value of information and information sharing: discussion of the Beer game and Barilla Spa case

March 27: (longer session: 8:30AM-10:30AM) guest lecture by Prof. Medini Singh: Role of IT in Supply Chain Transformation; Virtual Integration; Value Chain Dissection

April 1: NO CLASS

April 3 - 8: Inventory pooling and supply chain integration; two echelon inventory systems

April 10 - 15: Supply chain design; design for postponement: the HP Deskjet case

April 17 - 22: Global sourcing; outsourcing

April 24-29: Supply chain network design models

TBD: Final exam

Readings:

Jan 30: Chapter 1

Feb 4-6: Chapter 2, pp.27-35

Feb 11-13: Chapter 2, pp.35-41, Chapter 4, pp. 123-125

Feb 18: Chapter 2, pp. 63-77

Feb 20: Queueing Models and management (posted)

Feb 25-27: Chapter 2, pp.45-48, 56-60

Mar 4: Multi-period inventory models: economies of scale in procurement costs; multi-period inventory models with non-stationary parameters: handout (posted)

Mar 6: Littlefield supply chain game: discussion and analysis

Mar 11: Chapter 5, pp.143-161

Friday, March 15: Midterm (9AM -11AM, Warren 208)

March 18-22: SPRING BREAK

March 25: Chapter 5, pp.161-171

March 27: Chapter 6

April 1: NO CLASS

April 3-8: Chapter 11

April 10-15 Chapter3, pp.77-94.

April 17-22: Lu & van Mieghem, MSOM vol.11 (2009)

April 24-29: Chapter 10

TBD: Final Exam.