

IEE 534 SUPPLY CHAIN MODELING AND ANALYSIS

SPRING 2013 COURSE SYLLABUS

INSTRUCTOR:	Dr. Esma S. Gel, BY 318, 5-2906, Esma.Gel@asu.edu
OFFICE HOURS:	M 1:00 pm-2:00 pm, T 10:00-11:00 am, others strictly by appointment.
CLASS MEETING:	M-W 3:00-4:15 pm; Room: BYAC 220
TEACHING ASSISTANT:	Aysegul Demirtas, BYENG 313
TA OFFICE HOURS:	T-Th 1:00-2:00 pm
TEXTBOOKS:	<i>Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies</i> , Third Edition, Simchi-Levi, Kaminsky and Simchi-Levi, McGraw Hill-Irwin (2002). (Previous editions are also ok.) <i>Matching Supply with Demand: An Introduction to Operations Management</i> , Cachon and Terwiesch, McGraw Hill-Irwin, New York, NY, 2006
OPTIONAL REFERENCES:	<i>Supply Chain Management: Strategy Planning and Operation</i> , S. Chopra and P. Meindl, Prentice Hall, Upper Saddle River, NJ, 2001.
PREREQUISITES:	Fundamental knowledge in Operations Research techniques (linear and integer programming including the ability to use commercial software to solve problems), probability and statistics, stochastic modeling, computer programming. Prerequisites: CSE 100 or 110, IEE 470, IEE 376. Recommended: IEE 574, IEE 575.
COURSE OBJECTIVES & DESCRIPTION:	<p>The objective of the course is to expose students to the basic issues that need to be considered in designing and operating supply chains and a variety of modeling tools available for their analysis.</p> <p>Emphasis will be on application and development of mathematical modeling techniques for the analysis of strategic, tactical and operational supply chain problems including inventory management, revenue management, distribution & facility location, supply contracts and coordination among supply chain partners. Other related topics to be covered include various critical concepts and strategies such as risk pooling, information sharing, and the role of information systems in supply chain management</p>
LEARNING TOOLS:	Classes will consist of lecturing, active and collaborative learning exercises, and discussions. We will cover material from journal articles and other books, in addition to the textbook. When available, you will be asked to download and print lecture slides or other material before the classroom session, and bring them to class. We will use ASU's Blackboard system for this purpose (further details to follow). You should also be prepared to take notes.
EVALUATION:	Grades will be based on individual and team assignments (50%) and exams (one or two midterms, and a final exam) (50%). Final grades will generally be determined according to the following: $\geq 90\%$ is an A, $\geq 80\%$ is a B, $\geq 70\%$ is a C, $\geq 60\%$ is a D and $< 60\%$ is an E.
OTHER INFO	You are encouraged to discuss problems with classmates on two conditions: (1) you cite the contributions of others clearly, (2) you write up the assignment on your own, alone!!! The use of old course files borrowed from previous students is strictly forbidden; I consider it as an act of cheating and plagiarism. Finally, it is imperative that you come to class on time, since this disrupts the flow of the course.

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SPRING 2013 SELECTED LIST OF TOPICS

1. INTRODUCTION TO SUPPLY CHAIN MANAGEMENT (CH. 1 OF SKS)

- Definition of supply chain management. Key supply chain costs and metrics; the potential of supply chain management, fundamental issues and trade-offs.

2. INVENTORY MANAGEMENT AND RISK POOLING (CH. 3 OF SKS; C&T):

- Deterministic inventory models: EOQ and power-of-two policies
- Stochastic inventory models: base-stock policies and (Q, R) policies, forecasting, lead times, defining and measuring service level in inventory systems
- Multi-location inventory models: risk pooling, inventory sharing and transshipment, heuristics for multi-echelon inventory control
- **Case Study:** Using inventory control and management techniques for multi-echelon, stochastic environments.

3. SUPPLY CHAIN NETWORK DESIGN AND OPTIMIZATION (CH. 2 OF SKS):

- Modeling the supply chain as a network; relationship to various network models such as fixed charge network flow problems
- *Facility location models:* Location of facilities of different types, allocation of service areas to facilities
- *Warehousing and Transportation Models:* Modeling the effects of different warehousing and transportation choices
- **Case Study:** Using math programming models and scenario analysis to examine network design and optimization problems.

4. TRANSPORTATION AND DISTRIBUTION STRATEGIES (CH. 5 OF SKS):

- Direct shipment, warehousing, cross-docking strategies
- Information Technology requirements for distribution planning
- Distribution systems for push and pull production systems
- Transportation decisions (mode selection, fleet size)

5. SUPPLY CHAIN CONTRACTS AND COORDINATION

- Centralized vs. decentralized supply chains
- Flexibility in supply chain contracts : quantity flexibility
- Supply chain coordination with contracts
- Revenue sharing

6. INFORMATION AND COLLABORATION IN SUPPLY CHAINS (CH. 4, 6, AND 9 OF SKS)

- Value of Information: Bullwhip effect, beer game exercise, collaborative forecasting, IT requirements for effective supply chain management
- Aligning the supply chain for collaboration: coordinating distribution strategies, information sharing, product design and marketing, design for logistics (postponement, commonality, etc.)
- E-commerce as an enabler for supply chain integration

7. OTHER TOPICS FROM SUPPLY CHAIN MANAGEMENT (as time permits)

- Revenue management
- International and cultural considerations
- Environmental and legal concerns: product recovery and recycling, life cycle analysis