ISYE 3103 SUPPLY CHAIN MODELING: LOGISTICS

Credit: 3-0-3

Prepared Marc Goetschalckx, Spring 2008

Prerequisite(s): ISyE 2028 and 3133

Catalog Description:
Course focuses on engineering design concepts and optimization models for logistics decision making in three modules: supply chain design, planning and execution, and transportation.

Text:
Different textbooks and notes are used depending on the instructor:

Ghiani, G., G. Laporte, and R. Musmanno, (2004), **Introduction to Logistics Systems Planning and Control**, John Wiley and Sons, Chichester, England. ISBN 0470849169.

Murphy, P. R. and D. F. Wood, (2008), **Contemporary Logistics**, (9th Edition), Pearson Prentice-Hall, Upper Saddle River, New Jersey.

Goetschalckx, M., (2011), **Supply Chain Engineering**, 1st Edition. Springer.

Objective

The objective of this course is to teach the student how to successfully complete an engineering design or planning project in order to prepare the student for his capstone design project and for design and planning projects in industry. The target area is the design of industrial logistics systems. Important areas within industrial logistics are transportation, inventory in the supply chain, supply chain network configuration, and integrated supply chains.

Outline
1. Transportation Systems: transportation modes and respective characteristics, transportation structures, transportation terminology and documentation
2. Transportation Modeling: single and multiple flow routing, single and multiple vehicle routing. For each topic the basic problem characteristics, models, and basic solution algorithms are treated.
3. Inventory in the Supply Chain: service levels, single and multiple echelon inventory models. For each topic the basic problem characteristics, models, and basic solution algorithms are treated.
4. Supply Chain Network Configuration: facility location in the continuous and discrete space. For each topic the basic problem characteristics, models, and basic solution algorithms are treated.

5: Integrated Supply Chain Modeling: distribution channel selection, integrated models for single-country and global supply chains. The basic problem characteristics and models are discussed.

Outcomes and their relationships to ISyE Program Outcomes
At the end of this course, students will be able to:
- Structure industrial logistics problems by identifying the objectives, constraints, and decisions variables
- Design and plan logistic systems by applying the engineering design method
- Identify major classes of industrial logistics systems and operations and recognize their most significant characteristics
- Model the basic variants of industrial logistics problems and solve them with basic solution algorithms

Course outcome \ Program Outcomes	a. apply math	b. data	c. IE method	d. team	e. problem solving	f. prof/ and ethical responsibilities	g. communication	h. global, eco, envi and soc context	i. continue to improve	j. current issues	k. participate in an organization
Structure logistics problems	L		M		H		L	L		L	M
Design and plan logistics systems	H	H	H	L	H	L	M			L	M
Identify classes of logistics systems and operations	L	L	L				M			M	L
Model and solve supply chain systems	H	M	M		H		L				

- H, M and L denote high, moderate and low relationships.
- Team project are sometimes conducted

Evaluation of the important outcomes
Three or more important outcomes will be evaluated from direct questions on the Final exam:

1. Students are cognizant of basic logistics terminology, characteristics of logistics systems, and of the characteristics of solution algorithm for the design and management of logistics systems;
2. Students are able to create a mathematical model for a logistics problem or aspect of a problem;
3. Students are able to solve a small instance of a basic logistics problem with one or more basic algorithms;