ISYE 3103 SUPPLY CHAIN MODELING: LOGISTICS

Credit: 3-0-3

Prepared Prof. Alan Erera, Fall 2013

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:
Course note set.

Goetschalckx, M., (2011), **Supply Chain Engineering**, Springer, New York, New York.

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.

Topical coverage
The topical coverage and approximate number of weeks are in the table below.

Topics	Weeks
Supply chain concepts: components, and configurations: processes and facilities, cost and other performance indicators, economies of scale, consolidation and coordination	1.5
Freight transportation systems: transportation costs and rates, networks of transport services, role of minimum cost paths.	1.5
Supply chain inventory management: One-to-one, EOQ, pipeline inventory, mode selection, uncertain demand and periodic review, non-stationary demand, safety stock.	3
Supply chain network 7ow management: One-to-many and many-to-many flows, scale economies, uncertainty in network flow modes, time-space network.	3.5
Freight transportation management: multi-stop single vehicle routing and scheduling, multiple vehicle, vehicle fleet management	3
Supply chain network design: facility location models, location-allocation models, inventory considerations in SC network design.	2.5

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. Design, conduct experiment, analyze interpret data**	**c. Design System**	**d. team**	**e. problem solving**	**f. prof/ and ethical responsibilities**	**g. communication**	**h. global, eco, envi and soc context**	**i. Life-long learning**	**j. Contemporary issues**	**k. use tools for eng. practice**
Structure logistics problems			Med		High						High
Design and plan logistics systems	Med	Med	High	Low	High	Low	Med				High
Identify classes of logistics systems and operations			Low				Med				
Model and solve supply chain systems	High	Med	Med		High		Low				High

- 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;

ISyE ABET Student Outcomes a - k

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.