ISYE 3103 SUPPLY CHAIN MODELING: LOGISTICS

Credit: 3-0-3

Prepared Profs. Erera, Toriello, Vande Vate, Summer 2018

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.	4
Supply chain network 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	2
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:

1. Structure industrial logistics problems by identifying the objectives, constraints, and decisions variables
2. Design and plan logistic systems by applying the engineering design method
3. Identify major classes of industrial logistics systems and operations and recognize their most significant characteristics
4. Model the basic variants of industrial logistics problems and solve them with basic solution algorithms

Course outcome \ Program Outcomes	**1. identify, formulate solve engg prob by engg, sci & Math**	**2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic**	**3 communicate with a range of audience**	**4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.**	**5. effective on a team provide leadership, collaborative and inclusive envirn, plan tasks & meet objectives**	**6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.**	**7. acquire and apply new knowledge using appropriate learning strategies**
1. Structure industrial logistics problems by identifying the objectives, constraints and decision variables							
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Evaluation of the important outcomes

The course outcome 2 and 4 can be assessed on targeted final exam questions.

The approximate relationship from prior ABET a – k to new ABET 1 – 7.

OLD Criterion 3. Student Outcomes The program must have documented student outcomes that prepare graduates to attain the program educational objectives. Student outcomes are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.	NEW Criterion 3: Student Outcomes The program must have documented student outcomes that support the program educational objectives. Attainment of these outcomes prepares graduates to enter the professional practice of engineering. Student outcomes are outcomes (1) through (7), plus any additional outcomes that may be articulated by the program.
(a) an ability to apply knowledge of mathematics, science, & engineering (e) an ability to identify, formulate, and solve engineering problems	(1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	(6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
(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 & safety, manufacturable, & sustainable	(2) An ability to apply engineering design to produce solutions that meet specified needs with consideration for public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
(d) an ability to function on multidisciplinary teams	(5) An ability to function effectively on a team whose members together provide leadership, create a collaborative & inclusive environment, establish goals, plan tasks, and meet objectives.
(f) an understanding of professional and ethical responsibility (h) the broad education necessary to understand the impact of engg solutions in a global, economic, environmental, & societal context (j) a knowledge of contemporary issues	(4) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
(g) An ability to communicate effectively.	(3) An ability to communicate effectively with a range of audiences.
(i) a recognition of the need for, and an ability to engage in life-long learning	(7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	Implied in 1, 2 and 6