ISYE 4301 Supply Chain Economics

Credit: 3-0-3

Prepared Profs. Griffin and Zhou, Spring 2015

Prerequisite(s): ISyE 3133, ISyE 3232

Catalog Description:
The course studies techniques for coordination and collaboration in supply chains. Applications include pricing strategies, revenue management, gaming, and incentives.

Text:
Notes

Reference:
HBR Resources: Aligning Incentives for Supply Chain Efficiency, by V.G. Narayanan, Ananth Raman, April 10, 2000. Prod. #: 600110-PDF-ENG.

Topical Outline
This course will discuss the qualitative and quantitative issues in

Topic	Weeks
Introduction and objectives: cost, profit other measures and triple bottom line	0.5
Economic forces in the supply chain: scale, variability and risk pooling, scope and speed	3.5
Supply chain logistics networks, push and pull	1
Intro to principal agent models, information asymmetry	1
Incentives through contracts	1
Quantitative principal agent models	1
Economies of competition and differentiation: Cournot and Bertrand competition	2
Pricing and revenue management	2
Summary	1
Project presentations	1
Total	14

Outcomes and their relationships to ISyE Program Outcomes
At the end of this course, students will be able to:

- Understand and quantify the economies of scale, scope, speed and variability
- Understand and quantify economies of supply chain networks
- Understand and quantify the information and incentives
- Understand and quantify the economies of competition, differentiation and pricing in various type of industrial organizations
- Application of the economic forces above to supply chain problems

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. Understand and quantify the economies of scale, scope, speed and variability	H						
2. Understand and quantify economies of supply chain networks	H						
3. Understand and quantify the information and incentives	H						
4. Understand and quantify the economies of competition	H		H	M		H	
5. Application of the above to supply chain problems					H		

Evaluation of the important course outcomes

The course outcomes 1, 2, 3 are assessed by final exam questions, and 4 and 5 by course projects,

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