

ISYE 4301 Supply Chain Economics

Credit: 3-0-3

Prepared Prof. Griffin, Spring 2008

Prerequisite(s): ISyE 3133, ISyE 3232

Catalog Description:

Topics include pricing models; revenue management; gaming and equilibrium; principal agent models; auctions; supply chain coordination strategies; and value of information.

Text:

Competitive Solutions: The Strategist's Toolkit, by R.P. McAfee, Princeton University Press, 2002

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Objective

To provide the student with a broader strategic perspective about operations. In particular there is a focus on the following issues:

- To show that many of the operational parameters (such as demand) depend on our decisions and how to incorporate these factors into our analysis
- To develop models that incorporate strategic competitor/consumer behavior
- To understand how market structure affects decisions
- To show the benefits of coordination and collaboration along with techniques for achieving and maintaining it

Applications include pricing strategies, revenue management, differentiation strategies, and incentives.

Topical Outline

1. Pricing Models: understanding components of price optimization, bundling, market segmentation strategies, and price discrimination strategies such as two-part tariffs.
2. Revenue Management: understanding when it can be applied, the development of mathematical models including bid pricing and expected marginal seat revenue, and overbooking.
3. Equilibrium and Games: understanding the concept of Nash equilibrium, and be able to find different equilibria including Bertrand, Cournot, and Stackelberg, as well as the notion of Pareto efficiency and mixed strategy in games
4. Supply Chain Coordination: introduction to coordination strategies such as revenue sharing and transfer payments, understanding the value of information.
5. Value of Information in supply – understanding the importance of information asymmetries and agency issues. Introduction to moral hazard, adverse selection and developing principal agent models
6. Auctions – understanding the basic design of auctions as well as bidding strategies.

Outcomes and their relationships to ISyE Program Outcomes

At the end of this course, students will be able to:

- Understand when pricing strategies and auctions can be used in real-world situations to help improve profitability
- Develop mathematical models for pricing, revenue management, and auctions
- Develop strategies and mathematical models to help coordinate supply chains
- Make sound recommendations based on solutions, analyses, and limitations of models

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 develop	j. current issues	k. participate in an organization
Understand when pricing strategies and auctions can be used in real-world situations to help improve profitability		M	H	M P		M	M P	H	M	M	M
Develop mathematical models for pricing, revenue management, and auctions	H	M	H	M P	H						
Develop strategies and mathematical models to help coordinate supply chains	H	M	H	M P	H		M P	H		M	
Make sound recommendations based on solutions, analyses, and limitations of models		M		M P	H	M		H	M		M

- H, M and L denote high, moderate and low relationships.
- P: A team projects is conducted with a final report.