

## **ISYE 3104 SUPPLY CHAIN MODEL: MANUFACTURING & WAREHOUSING**

**Prepared** by Prof. Keskinocak, Fall 2013

**Credit:** 3-0-3

**Prerequisite(s):** ISYE 2028 Statistics and ISYE 3232 Stochastic Process, Co-requisite ISyE 3133 Engineering Optimization

### **Catalog Description**

Design and operation of manufacturing, service and warehousing facilities.

### **Text**

Steven Nahmias *Production and Operations Analysis*, 5th edition, Irwin, 2005 (supported by additional references wherever necessary, typically provided to the students through the “Reserves” system of the campus library).

### **Objectives**

In the last twenty years, our view of manufacturing and its role in the attainment of competitive advantage has changed considerably. The market share of many companies declined as a result of their inability to compete on the basis of product design, cost and quality. Most companies now agree that world class performance in operations is essential for successful competition and long term survival.

The goals of this course are to provide an introduction to the fundamental issues and decisions associated with operations management, to motivate basic concepts, and to illustrate common problems in production and solution approaches. These goals will be accomplished through lectures, homework, and readings. Lectures will generally emphasize the theoretical aspects of the field, and homework will focus on problem solving skills. Guest lectures, videos and classroom games may complement the class material and help you to connect theory with practice.

## Topical Outline

Topics	Weeks
Introduction: The role of Operations Management in modern corporations and its connection to corporate strategy.	1
Make or buy	0.5
Aggregate Planning	1
Inventory Control Systems: Economic order quantity and its variations, such as finite replenishment rate and quantity discounts.	2
Inventory subject to uncertain demand: The newsvendor model and its applications. Probabilistic inventory models, service levels and safety stocks.	3
Resource allocation in constrained environment: game/case	1
Push/pull production control systems, MRP/JIT	1
Lot sizing.	1
Scheduling	1.5
Warehousing systems	1
Layout Design	1
Warehousing operations: Warehousing processes, layouts, material handling, order picking strategies, fast pick models and slotting methods, cross-docking.	1
Emerging issues: Global operations, ethics and the environment.	1
	16.5

## **Outcomes**

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

- understand and describe the factors that affect the operations in manufacturing, service, and distribution;
- apply mathematical models to coordinate the deployment and allocation of resources such as labor, inventory, space, equipment and capital, towards the satisfaction of the demand and any additionally posed constraints;
- use optimization, database and productivity software tools in solving practical operational problems;
- work in teams in a team project;
- appreciate the significance of issues such as ethics and sustainability, which currently emerge in the operations of the aforementioned systems;
- use reference resources to find models and methods not covered in the class.

<b>Course outcome \ Program Outcomes</b>	<b>a. apply math</b>	<b>b. Design, conduct experiment, analyze interpret data</b>	<b>c. Design system</b>	<b>d. team</b>	<b>e. problem solving</b>	<b>f. prof/ and ethical responsibilities</b>	<b>g. communication</b>	<b>h. global, eco, envi and soc context</b>	<b>i. Life-ling learning</b>	<b>j. Contemporary issues</b>	<b>k. use tools for eng. practice</b>
Ability to understand and describe the factors that affect the operations ... (exam question)		Med	Med		Med	Low	High	Low			Low
Ability to apply models to coordinate resources ... (Exam question in planning, inventory, schedule and storage problems)	High	Low	High		High						High
Ability to use optimization, data base and productivity software ... (assignment, project)	Med	High	Med	Med	High	Low	Low	Low	Low	Low	High
Knowledge of current issues in such systems as ethics and sustainability (Test question and case)						Med		Med	Low	High	
Ability to use reference resources (On-line reference searching)					High				High	Med	

### **Evaluation of the important outcomes**

The following outcomes will be assessed through the course exams:

1. Ability to understand and describe the factors that affect the operations.
2. Ability to apply analytical models for the deployment and allocation of resources in labor, inventory, space, equipment and capital.
3. Knowledge of current issues

## **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.