

# ISYE 3104 SUPPLY CHAIN MODEL: MANUFACTURING & WAREHOUSING

**Prepared** by Prof. Reveliotis, Fall 2007

**Credit:** 3-0-3

**Prerequisite(s):** ISYE 2028 and ISYE 3232

## **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**

The objective of this course is to introduce the students to the issues, models and methods that pertain to the design and operation of production, service and distribution systems.

## **Topical Outline**

1. *Introduction:* The role of Operations Management in modern corporations and its connection to corporate strategy.
2. *Inventory Control Systems:* Economic order quantity and its variations, such as finite replenishment rate and quantity discounts. The newsvendor model and its applications. Probabilistic inventory models, service levels and safety stocks.
3. *Production Planning and Control:* Production flows for discrete-part manufacturing and their documentation. “Make-or-Buy” decisions and capacity planning. Aggregate Planning. MRP explosion for multi-stage production systems. Lot sizing. Shop floor scheduling. Pull systems and the Just-In-Time philosophy.
4. *Layout Design:* Systematic Layout Planning. Cellular Manufacturing. Production Line Balancing.
5. *Warehousing Systems:* Warehousing processes, layouts, material handling, order picking strategies, fast pick models and slotting methods, cross-docking.
6. *Emerging issues:* Global operations, ethics and the environment.

## **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. data</b>	<b>c. IE method</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. continue to improve</b>	<b>j. current issues</b>	<b>k. participate in an organization</b>
Ability to understand and describe the factors that affect the operations ... (exam question)		M	M		M	L	H	L			L
Ability to apply models to coordinate resources ... (Exam question in planning, inventory, schedule and storage problems)	H	L	H		H						
Ability to use optimization, data base and productivity software ... (assignment, project)	M	H	M	M	H	L	L	L	L	L	M
Knowledge of current issues in such systems as ethics and sustainability (Test question and case)						M		M	L	H	
Ability to use reference resources (On-line reference searching)					H				H	M	

- H, M and L denote high, moderate and low relationships.

### **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.