

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING
ISEN 315: PRODUCTION SYSTEMS PLANNING

REQUIRED or ELECTIVE: Required Course

CATALOG DESCRIPTION (3-0) Credit 3

Principles, models and techniques for planning, analysis and design of integrated production systems; optimization principles, including linear programming, unconstrained and equality constrained optimization and dynamic programming applied to production planning; topics to include capacity expansion models, learning curves, aggregate planning models, deterministic and stochastic inventory, MRP and project scheduling.

PREREQUISITES

ISEN 220, MATH 304

CO-REQUISITES

ISEN 420

PROFESSIONAL COMPONENT

This course provides the fundamental concepts and theory for the treatment of the principles, models, and techniques for the planning, analysis, and design of production and service systems. Course topics include forecasting, inventory management, production planning, project scheduling, and materials requirement planning problems with an emphasis on analytical modeling approaches and optimization methods used to obtain their solutions. These approaches and methods emphasize the decision-making process in operational planning, analysis, and design of production or service facilities. The course is aimed at developing a better understanding of production and operations management problems, and providing foundations for mathematical modeling/programming methods needed to solve these problems.

COURSE LEARNING OUTCOMES

At the end of the course, students should be able to

- learn formulations, models, and analytical procedures for the study of production planning and operations management problems;
- learn fundamental principles of inventory control;
- be able to develop optimization models for capacity, production, and inventory decisions; and
- improve systems thinking and modeling skills.

TEXTBOOK

Production and Operations Analysis; S. Nahmias (6th Edition), McGraw-Hill, 2008.

TOPICS COVERED

Topic	Chapter
1. Strategy and Competition	1.1 – 1.12
2. Forecasting	2.1 – 2.9
3. Aggregate Planning	3.1 – 3.4
4. Linear Programming	S1.1 – S1.9
5. Inventory-Certain Demand	4.1 – 4.12
6. Inventory-Uncertain Demand	5.1 – 5.7
7. Supply Chain Management	6.1 – 6.11
8. MRP & JIT	7.1 – 7.10
9. Operations Scheduling	8.1 – 8.10
10. Queuing Theory	S2.1 – S2.9
11. Facilities Layout and Location	10.1 – 10.10
12. Quality and Assurance	11.1 – 11.4

CLASS AND LAB SCHEDULE

One hundred and fifty minutes of lectures per week; either three days a week at 50 minutes per day or two days a week at 75 minutes per day. No laboratory component.

CONTRIBUTION TO MEETING REQUIREMENTS OF CRITERION 5:

Subject	Semester hrs	Subject	Semester hrs	Subject	Semester hrs
Mathematics		Engineering Science	2	General	
Basic Science		Engineering Design	1		

RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES:

- A. Ability to apply knowledge of mathematics, science and engineering
- E. Ability to identify, formulate and solve engineering problems
- K. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice

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Date April 28, 2010