

IE 466 – PRODUCTION PLANNING AND INVENTORY CONTROL

Designation as a 'Required' or 'Elective' course

TYPE OF COURSE: Required for BSIE and BSEM Majors

Course (catalog) description

COURSE DESCRIPTION: IE466 Production Planning and Inventory Control. 3 undergraduate hours; 4 graduate hours. Principles of demand forecasting, production planning, master scheduling, job sequencing, design and control of deterministic and stochastic inventory systems, and material requirement planning

Prerequisite(s)

PREREQUISITE(S): IE342 Probability and Statistics (3 hrs), IE 345: Regression and Forecasting (3 hrs) and IE 471 –Operations Research (3 Hours)

Textbook(s) and/or other required material

SAMPLE SOURCES AND RESOURCE MATERIALS: Production and Operations Analysis (6th Edition), S. Nahmias, McGraw Hill, 2009

Course objectives

COURSE OBJECTIVES: To teach students to apply basic optimization techniques to formulate and solve problems that arise in production systems. With the successful completion of the course, students are equipped with a general understanding of (integrated) production systems and a palette of optimization tools for solving commonly encountered production planning and control problems, including aggregate and disaggregate planning, job shop scheduling, and inventory control.

Topics covered

MAJOR TOPICS:		Hrs
1.	Introduction to production system	1
2.	Forecasting techniques	8
3.	Aggregate and disaggregate planning	7
4.	Inventory system and control	7
5.	Material planning requirement	7
6.	Job shop scheduling	7
7.	Integrated production systems: push vs. pull systems, JIT	5
8.	Exams and/or quizzes	3
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	Total	45

Class/laboratory schedule, i.e., number of sessions each week and duration of each session

CREDIT HOURS: 3 undergraduate hours; 4 graduate hours.

Type of Instruction	Contact Hours/Week
Lecture-and-discussion	3

Contribution of course to meeting the professional component

Students are exposed to various bottleneck problems of various production systems and learn to formulate and solve them by using theoretical foundation of operations research and basic scientific/engineering principles. Through illustrative examples and discussions in class as well as problems from text and the literature, students get hands-on experience with optimization of commonly encountered production planning and control problems, including aggregate and disaggregate planning, job shop scheduling, and inventory control, and obtain a general understanding of (integrated) production systems. Contemporary issues and examples are presented and discussed in detail to provide students with insights as to how the class materials learned are related and can be used for their solution. Through the course, students learn the merits and shortcomings of local vs. heuristic vs. exact solution procedures and, through illustrations and discussions, learn how simple tools learned in class may be extended and modified to solve real-world production system-related problems.

Relationship of course to student outcomes

As shown in the BSIE Course Outcomes Matrix:

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

Comments on outcomes

- A. Use of linear algebra, calculus, optimization techniques, etc. to problems arising in production systems
- E. Supply chain modeling, production planning, and inventory control problems are described in class and also given to students as homework and exams. These problems are industrial engineering problems and the students learn how to formulate and solve those using analytical tools.
- K. In addition to developing problem solving capabilities by hand in exam situations, students are required/encouraged to use computer software and other mathematical applications for solving homework problems.

Person(s) who prepared this description and date of preparation

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