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): IE 471 –Operations Research (3 Hours)

Textbook(s) and/or other required material
SAMPLE SOURCES AND RESOURCE MATERIALS: Production and Operations Analysis (Fifth Edition), S. Nahmias, McGraw Hill, 2005

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

Class/laboratory schedule, i.e., number of sessions each week and duration of each session
CREDIT HOURS: 3 undergraduate hours; 4 graduate hours.

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<th>Type of Instruction</th>
<th>Contact Hours/Week</th>
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<tr>
<td>Lecture-and-discussion</td>
<td>3</td>
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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 program 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
i. Recognition of the need for, and an ability to engage in life-long learning

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.
i. 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
Hong Seo Ryoo (Assistant Professor) of Mechanical & Industrial Engineering, January 31, 2002
Updated by Houshang Darabi, Associate Professor of Industrial Engineering, January 7, 2008.