IE 366 Manufacturing and Service Systems Planning II

Year and Semester: 2015-2016 Spring
Credit Hour: (3 2 4)
ECTS: 6
Prerequisite(s): IE 232 (Operations Research I – Modeling)
               IE 227 (Introduction to Probability)

Catalog Description

This is the second of two sequel courses, which are designed to introduce the basics of production planning and control with the need of modern manufacturing organizations in mind. The topics covered in the second course are: stochastic and independent demand inventory management; practical techniques for inventory control; master scheduling; material requirements planning; capacity planning; production activity control (scheduling); project planning, scheduling and control; distribution planning and scheduling; pull production control systems (just-in-time production philosophy, kanban systems).

Textbook

Reference Books

Course Objective

This course aims to introduce basic and advanced models and solution techniques for requirements planning, capacity, scheduling and project management problems for manufacturing and service systems.

Learning Outcomes

On successful completion of the course, all students will have developed:
- Capability to use quantitative methods to model, analyze, and optimize manufacturing and service systems planning problems
- Capability to formulate mathematical programming models for solving a variety of manufacturing and service systems planning problems, and have improved their skills in mathematical modeling
- Ability to understand the shortcomings and limitations of analytical models and quantitative solution techniques devised for solving the manufacturing and service systems planning problems and how qualitative decision making can be incorporated
- Practical skills on use of computer software packages (such as LINGO, GAMS, CPLEX, etc.) and coding an algorithm in a general purpose language

On successful completion of the course, all students will be:
- Involved in teamwork
- Aware of ethical issues

Course Outline

Week 1: Independent-demand versus dependent-demand inventory systems. Single-item inventory models subject to stochastic demand. Reorder point models. The service level approach.
Week 2: The optimal \((Q, R)\) model. The cases of backorders and lost sales. Inventory management for perishable items. Single period models.
Week 3: Periodic review models with stochastic demand. The \((S, T)\) model.
Week 4: Practical implementation issues for inventory control. Base stock and two-bin policies. Continuous review versus periodic review. The ABC classification approach and its use in manufacturing and service systems.
Week 5: Dependent demand inventory systems and hierarchy of decision making for production/order lot sizes. Master Production Scheduling (MPS). Material Requirements Planning (MRP) basics.
Week 10: Mathematical programming formulations of some deterministic and static scheduling problems. Fundamental algorithms in machine scheduling theory
Week 11: Project management activities. Precedence relations and the project management network. The Critical Path Method (CPM).
Week 14: Mechanics of Kanban, CONWIP systems and bottleneck scheduling. Optimized Production Technology (OPT) and Theory of Constraints (TOC). Recent issues in production and operations planning.
Computer Usage

Computer packages might be required for some homework assignments. Lab tutorial sessions can be organized for the benefit of the students if necessary.

Grading

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<tbody>
<tr>
<td>Homework</td>
<td>15%</td>
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<td>Midterm-1</td>
<td>27.5%</td>
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<td>Midterm-2</td>
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<td>Final Exam</td>
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Lecture Hours

**Section 1:**
- Monday 15:20—17:10 (LB-06)
- Thursday 14:20—15:10 (L-111)
- Thursday 15:20—17:10 (L-111, recitation)

**Section 2:**
- Monday 12:20—14:10 (RB-04)
- Thursday 13:20—14:10 (L-111)
- Friday 11:20—13:10 (L-111, recitation)

Lecturer

Hakan Özaktaş, Ph.D in Industrial Engineering
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Office hour: TBA

Assistant

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Office hour: TBA
IMPORTANT NOTES

- Communication will be made through http://webonline.cankaya.edu.tr. Announcements should be checked regularly. Students should check their accounts to make sure that they can access the page of IE 366 through webonline.
- Every student should study regularly from the textbook. Copies of the textbook are also available in the university library at the Reserve section.
- Minimum attendance of 70% for lectures and 80% for recitation hours is required.
- Make-up exams for the Midterms are given only for students who have medical reports given (or approved) by Çankaya University Health Center. All medical excuse reports should be officially submitted within 7 working days (starting from the end-date of the medical excuse). Make-up exams will not be given for applications which are not submitted on time.
- Make-up exams are not offered for students not having attended Final exams even in the presence of valid medical reports.