Tentative Course Syllabus
IE 366 Manufacturing and Service Systems Planning II

Year and Semester: 2016-2017 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 planning issues for manufacturing and service systems. The topics covered in the second course are stochastic and independent demand inventory management, master scheduling, capacity requirements planning, push production control systems (MRP, MRP II), production activity control (scheduling in different production environments, priority rules), project scheduling, pull production systems (just-in-time production, kanban).

Textbook

- S. Nahmias, *Production and Operations Analysis* (6th ed.), McGraw-Hill, 2010.

Reference Books

- D. Sipper, and R.D. Bulfin, *Production Planning, Control, and Integration*, McGraw-Hill, 1997.
- E.A. Silver, D. Pyke, and R. Peterson, *Inventory Management and Production Planning and Control* (3rd ed.), Wiley, 1998.
- T.E. Vollmann, W.L. Berry, and D.C. Whybark, *Manufacturing Planning and Control Systems* (4th ed.), Irwin-McGraw-Hill, 1997.
- D.W. Fogarty, J.H. Blackstone, and T.R. Hoffmann, *Production and Inventory Management* (2nd ed.), South-Western College Publishing, 1991.
- S.L. Narasimhan, D.W. McLeavey, and P.J. Billington, *Production Planning and Inventory Control* (2nd ed.), Prentice-Hall, 1995.
- J. Browne, J. Harhen, and J. Shivnan, *Production Management Systems: An Integrated Perspective* (2nd ed.), Addison-Wesley, 1997.
- S.N. Chapman, The Fundamentals of Production Planning and Control, Pearson Education, 2006 .

Course Objective
The main aim of this course is:

- To introduce basic and advanced models and solution techniques for stochastic inventory planning problems.
- To introduce solution techniques for master scheduling, capacity and material requirements planning problems.
- To introduce basic and advanced models and solution techniques of production and project scheduling 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

Computer Usage
Computer packages might be required for some homework assignments.

Grading
Homework (2) 20%
Midterm 30%
Case study 15%
Final Exam 35%

Lecture Hours
Section I: Tuesday 14:20-17:20 (L-111),
Recitation: Wednesday 12:20-14:20 (L-111)
Section II: Wednesday 09:20-12:20 (L-111),
Recitation: Friday 13:20-15:20 (L-111)

Lecturer
Ayyuce Aydemir Karadağ, Ph.D in Industrial Engineering
Office: L-310, aykaradag@cankaya.edu.tr
Office hour: Tuesday 13:20-14:20 (Section I)
Wednesday 13:20-14:20 (Section II)

Assistant
Funda Güner, M.S in Industrial Engineering
Office: L-324, fkarabak@cankaya.edu.tr
Office hour: TBA –

IMPORTANT NOTES
You are welcome to work in groups on the case study and homeworks. Here are the rules regarding group work.
- A group must consist of either two or three people.
- Each group should submit a single solution, which should be clearly labeled with the names of the group's members.
- The members of a group will all receive the same grade on an assignment, reflecting the quality of the group's collective solution to the assignment.
- You can work in different groups on different assignments.

You are responsible for all announcements made in class and on class web page. You are also responsible for printing the assignments and lecture notes from the class web page. Every student should study regularly from the textbook.

- Attendance at lecture will be taken and it is of student's benefit to attend all of the lecture hours.
- Students who do not take the midterm exam (or its make-up exam) can not take the final exam or its make-up). Students who do not attend the final exam receive a " NA" letter grade from the course.

Course Outline: A tentative outline is given below and the instructor reserves the right to make changes as she sees necessary.

Course Outline *List the topics covered within each week.*	
Week	Topic(s)
1	*Review: Deterministic Models*
2	*Stochastic and Independent Demand Inventory Management*: continuous-review models
3	*Stochastic and Independent Demand Inventory Management*: periodic-review models, safety stocks and service levels
4	*Stochastic and Independent Demand Inventory Management*: single-period models
5	*Master Production Scheduling (MPS)*
6	*Materials Requirements Planning*
7	*Rough Cut Capacity Planning* (RCCP): role of RCCP in the production planning and control system, RCCP techniques (capacity planning using overall factors, bill of labor approach, resource profile approach),
8	*Capacity Requirements Planning (CRP)*: CRP logic, CRP computation, forward and backward scheduling
9	*Production Scheduling*: manufacturing lead time (MLT), methods for reducing MLT (operation overlapping, operation splitting), scheduling techniques (forward scheduling and backward scheduling, infinite loading, finite loading), dispatching rules
10	*Production Scheduling*: classification of scheduling problems, scheduling criteria (performance measures), shop structures (single machine, parallel machines, flow lines, job shops)
11	*Production Scheduling*: scheduling algorithms for solving problems in various shop structures, assembly line balancing
12	*Project Scheduling*: representing a project a network, critical path analysis (CPM), time-costing methods
13	*Project Scheduling*: linear programming modeling for CPM problem, project evaluation and review technique (PERT), resource constraints in the projects
14	*Pull Production Systems*: just-in-time (JIT), philosophy of JIT, lean production, Kanban systems, CONWIP-based production