

PRODUCTION PLANNING & CONTROL

Course Description

Production / manufacturing systems are considered as the backbone of economy in many countries. However, faced with increased competition from neighbouring countries the manufacturing industry in Pakistan is under increased pressure and numerous manufacturing jobs are lost each day. To address this steady decline, the managers of the future need to understand and master techniques/tools required for the smooth operations of productions systems.

Course Objectives

- To provide a contemporary outlook on the production / manufacturing systems.
- To enable students to understand the multidisciplinary nature of problems faced by production system (which concern various disciplines such as – design, process planning, sales, customer relations, inventory control, etc)
- To develop in the students erudition knowledge and problem solving skills for addressing production related issues.

Course Learning Outcomes

After completing this course, students should be able to:

- Understand operations, models and metrics of production planning and control.
- Understand the role of inventory in efficient operations of manufacturing system.
- Learn about various production methodologies like MRP, JIT, Pull, Push and Lean Production.
- Study how production scheduling is conducted.
- Understand the basic factory dynamics and tools to handle the issues that arise in running a factory.

Text and reference books

- “Factory Physics”, Wallace J. Hopp and Mark L Spearman, 3rd Edition, Waveland Press Inc .

- “Production and Operational Analysis”, Steven Nahmias, 6th Edition, McGraw-Hill.
- “Work Systems: The Methods, Measurement and Management of Work”, M.P. Groover, 1st Edition, Pearson Education Prentice Hall.

Course Content

Week No	Lecture Topics	Proposed Reading/Viewing
1	Introduction to Production Planning ▪ Four V ▪ Five Performance Objectives	Chap 2 (<i>Production and Operations Analysis</i> by Nahmias).
2	Inventory Control Subject to Known Demands ▪ Types of Inventories ▪ Motivation to Hold Inventories ▪ EOQ Model ▪ Quantity Discounts and EOQ Models for Production Planning	Chap 4 (<i>Production and Operations Analysis</i> by Nahmias). Chap 2 (<i>Factory Physics</i> by Hopp & Spearman).
3	Inventory Control Subject to Uncertain Demands ▪ Nature of Randomness and Optimization Criterion ▪ Newsboy Model ▪ Lot-Size Re-order Point Systems ▪ Service Level in (Q,R) Systems ▪ Overview of Advanced Topics	Chap 5 (<i>Production and Operations Analysis</i> by Nahmias). Chap 2 (<i>Factory Physics</i> by Hopp & Spearman).
4	MRP Crusade ▪ Material Requirement Planning – MRP ▪ Manufacturing Resource Planning – MRP II ▪ Enterprise Resource Planning	Chap 3 (<i>Factory Physics</i> by Hopp & Spearman).
5	JIT Revolution ▪ Origin and Goals of JIT ▪ Implementing JIT	Chap 4 (<i>Factory Physics</i> by Hopp & Spearman).

	▪ Kanban ▪ Lessons of JIT	
6	What Went Wrong ▪ Trouble with Scientific Management ▪ Trouble with MRP ▪ Trouble with JIT	Chap 5 (<i>Factory Physics</i> by Hopp & Spearman).
7	Science of Manufacturing ▪ Defining a Manufacturing System ▪ Objectives, Measures and Controls ▪ Models and Performance Measures	Chap 6 (<i>Factory Physics</i> by Hopp & Spearman).
8	Basic Factory Dynamics ▪ Definitions and Parameters ▪ Simple Relationships ▪ Labour Constrained Systems	Chap 7 (<i>Factory Physics</i> by Hopp & Spearman).
9	Mid Term Exam	
10	Push and Pull Production Systems ▪ Key Difference Between Pull and Push ▪ Magic of Pull ▪ CONWIP ▪ Comparing CONWIP with MRP and Kanban	Chap 10 (<i>Factory Physics</i> by Hopp & Spearman).
11	Shop Floor Control ▪ General Consideration ▪ CONWIP Configuration ▪ Other Pull Mechanisms ▪ Production Tracking	Chap 14 (<i>Factory Physics</i> by Hopp & Spearman).
12 & 13	Lean Production ▪ Elimination of waste in production ▪ Autonomation ▪ Worker involvement	Chap 20 (<i>Work Systems : The Methods, Measurement and Management of Work</i> by

		Groover).
14 & 15	Production Scheduling ▪ Goal of Production Scheduling ▪ Review of Scheduling Research ▪ Job Shop Scheduling ▪ Sequencing of Single and Multiple Machines	Chap 15 (<i>Factory Physics</i> by Hopp & Spearman). Chap 8 (<i>Production and Operations Analysis</i> by Nahmias).
16	Project Presentations	
17	Buffer Week	
18	Final Exam	