

MATERIALS MANAGEMENT

(Open Elective course for PGDM/ MBA Programme)

Objective

Objective of this course is to cover advance concepts related to the efficient and effective design of MRP and materials management as a whole. The course will cover the indepth analysis of Materials managemnet through the theory as well as case study.

Session wise Contents

Session 1

1. Intriduction to Materials Mangement
 - 1.1. Basics in MRP
 - 1.2. Factors NOT considered in conventional MRP
 - 1.3. Role of MRP in overall Manufacturing Planning Cotrol (MPC)

Session 2-4

2. Capacity Management
 - 2.1. Introduction to Capacity Planning
 - 2.1.1. Measuring Capacity
 - 2.1.2. Determination of available capacity
 - 2.2. Capacity Expansion Strategy
 - 2.3. Capacity Management
 - 2.3.1. Capacity Planning Using Overall Factors (CPOF)
 - 2.3.2. Capacity Bills
 - 2.3.3. Resource Bills
 - 2.4. Resource Planning
 - 2.5. Rough-cut Capacity Planning
 - 2.6. Capacity Requirement Planning
 - 2.6.1. Benefits of CRP
 - 2.6.2. Drawbacks of CRP
 - 2.7. Scheduling Rules (Paper by Panwalker and Iskander)
 - 2.8. Infinite versus and Finite Loading
 - 2.9. Comparing the Strategies

Session 5-6

3. Advance Concepts in MRP / Lot Sizing Rules
 - 3.1. Introduction
 - 3.1.1. Fixed Order Quantity (FOQ)
 - 3.1.2. Economic Order Quantity (EOQ)
 - 3.1.3. Lot-for-Lot (LFL)
 - 3.1.4. Fixed Period Requirement (FPR)
 - 3.1.5. Periodic Order Quantity (POQ)
 - 3.1.6. Least Unit Cost (LUC)

- 3.1.7. Least Total Cost (LTC)
- 3.1.8. Part-Period Balancing (PPB)
- 3.1.9. Wagner-Whitin Algorithm (W-W Algorithm)
- 3.1.10. McLaren's Order Moment (MOM)
- 3.2. Analysis of Different Lot Sizing Heuristics
 - 3.3. Determination of purchase Order Quantity
 - 3.3.1. The purchasing discount problem
 - 3.3.2. Buffering Concepts-Concept of Uncertainty, Safety Stock, Safety lead time
 - 3.3.3. Safety stock and safety lead time performance comparison

Session 7

4. Independent Demand Ordering System

- 4.1 Basic concepts
- 4.2 Independent versus dependent demand items
- 4.3 Function of inventory
- 4.4 Order preparation cost
- 4.5 Inventory carrying cost
- 4.6 Shortage and customer service cost
- 4.7 Inventory Decision rules
- 4.8 Order timing decision
 - 4.8.1. Sources of demand and supply uncertainty
 - 4.8.2. Determination of safety stock
 - 4.8.3. Customer service level

Session 8-9

5. Advance Independent Demand Ordering System

- 5.1. Basic Introduction on Ordering System
- 5.2. Advanced Independent Ordering Systems
 - 5.2.1. Order Quantity and Reorder Point
 - 5.2.1.1. Service levels and Order Quantities
 - 5.2.1.2. Total Cost Equation
 - 5.2.1.3. Grid search procedure
 - 5.2.1.4. The Iterative (Q, R) Procedure
 - 5.2.2. Inventory and Transportation Mode Interaction
 - 5.2.2.1. Total Cost Equation
 - 5.2.2.2. Transport Mode Decision Example
 - 5.2.2.3. Exact Methods
 - 5.2.2.4. Heuristic Methods
 - 5.2.3. Multiple Items From Single Source

- 5.2.3.1. Methods based on Individual item Reorder point
- 5.2.3.2. Methods based on Group Reorder point
- 5.2.3.3. A group service level method
- 5.2.4 Multiple Criteria ABC Analysis
 - 5.2.4.1. Multiple criteria ABC Analysis
 - 5.2.4.2. Multiple criteria ABC Management Policies

MID TERM EXAMINATION IN SESSION 10

Session 11-12

- 5. Supplier Selection for Effective Materials Management
 - 5.1. Role of Supplier in Material Management
 - 5.2. Ranking of Suppliers using AHP
 - 5.3. Single Period Multi-parts Multi-source Problem in Materials Management (Static model)
 - 5.3.1 Problem discussion
 - 5.3.2 Linear Programming Model
 - 5.4. Multi-period Multi-parts Multi-source Problem in Materials Management (Dynamic model)
 - 5.4.1. Importance of the Dynamic model
 - 5.4.2. Linear/Non-linear Programming model

Session 13-14

- 6. Demand Management
 - 6.1. Mathematical programming approaches
 - 6.1.1. Linear Programming
 - 6.1.2. Mixed Integer Programming
 - 6.1.3. Heuristic approaches
 - 6.2. Other approaches
 - 6.2.1. The linear Decision Rule
 - 6.2.2. The Management Co-efficient Model
 - 6.2.3. Search Decision Rule
 - 6.3. Types of Production Planning and Control Systems
 - 6.3.1. Pond-Draining System
 - 6.3.2. Push System
 - 6.3.3. Pull System
 - 6.3.4. CONWIP System
 - 6.3.5. DYNWIP System
 - 6.4. Theory of Constraint (TOC)
 - 6.4.1. Principles of TOC
 - 6.4.2. TOC in Production Planning

Session 15

- 7. Distribution Requirement Planning
 - 7.1. DRP in Manufacturing Industry
- 7.2. Linking DRP with Market
- 7.3. Linking DRP with demand management

- 7.4. Linking DRP with MPS
- 7.5. DRP Techniques
 - 7.5.1. The basic DRP record
 - 7.5.2. Time phased order point
 - 7.5.3. Linking several warehouse records

Session 16

- 8. Physical Inventory Distribution and Warehouse Management
 - 8.1 Physical Distribution System
 - 8.2 Interfaces
 - 8.3 Transportation
 - 8.4 Legal Types of carriages
 - 8.5 Warehousing
 - 8.5.1. Warehousing management
 - 8.5.2. Additional Technique
 - 8.6 Physical control and security
 - 8.7 Packing
 - 8.8 Material Handling

Session 17

- 9. Purchasing
 - 9.1 Introduction
 - 9.2 Establishing Specification
 - 9.3 Selecting Suppliers
 - 9.4 Price determination
 - 9.5 Impact of purchasing on MRP
 - 9.6 Expansion of MRP in Supply Chain
 - 9.7 AHP for supplier selection problem

Session 18-20

Case study presentation by individual groups.

Evaluation CRITERIA

- 1) Mid Term (30 marks)
- 2) Case Presentation (20 Marks)
- 3) Class Participation (10 Marks)
- 4) Class Attendance (10 Marks)

5) End Term (30 Marks)

REFERECES

1. Manufacturing Planning and Control by Thomas E. Vollmann, William L. Berry, and D. Clay Whybark.
2. Introduction to Materials Management by J.R. Tony Arnold, S.N. Chapman, L.M. Clive
3. Cases in Operations Managemnet by K.N. Krishnaswamy, M. Mathirajan
4. Capacity Planning Techniques for Manufacturing Control Systems: Information Requirements and Operational Features, Journal of Operations Management, Vol. 3, NO. 1, 1982, 13-25.