



## **Principles of Operations Management: Concepts and Applications – Topic Outline**

### **Principles of Manufacturing Management (PMM)**

#### **Session 1: Operations Management Foundations**

- Describe how today's business trends are driving operations management
- Define the science of operations management
- Identify the decisions made by operations managers
- Explain how operations management is important to both manufacturing and service functions
- Discuss the role of operations management in the organization
- Describe operations management's role in supply chain management
- Provide examples of how operations management is a competitive weapon
- Identify career opportunities in the field of operations management
- Perform a manufacturing management self-assessment review

#### **Session 2: Introduction to Manufacturing Management**

- Define manufacturing
- Review the components of manufacturing management
- Review product manufacturing choices
- Understand the impact of volume, variety, and lead time
- Explore product manufacturing choice positioning
- Detail manufacturing process choices
- Explore product and process choice positioning
- Review process layout options
- Explore process layout positioning
- Detail steps for developing a manufacturing strategy
- Outline manufacturing structural and infrastructural choices
- Understand product profiling
- Explore batch versus flow and push versus pull manufacturing techniques
- Detail job content and operator tasks

## **Session 2: Advanced Topics:**

- Product profiling
- Production plan issues
- Layout characteristics – exercise
- Performance objectives – exercise
- Process selection – unit costs
- Process selection – least cost

## **Session 3: Manufacturing Product Structures**

- Define the product structure
- Define the bill of material
- Define the process routing
- Product structure management process
- Bill of material uses
- Basic bill of material formats
- Achieving bill of material accuracy
- Define work centers
- Work center utilization and efficiency
- Processing time elements
- Establishing the process routing
- Manufacturing cost overview
- Product structure cost development
- Standard cost example

### **Advanced Topics**

- Modular bills of material
- Engineering change control management
- Advanced process routing exercise
- Activity based costing

## **Session 4: Basics of Material Requirements Planning (MRP)**

- Understand the requirements to plan and make a product
- Define the critical inventory question
- Define the two basic order methods: stock replenishment and material requirements planning (MRP)
- Understand the difference between independent and dependent demand
- Detail the problems with stock replenishment techniques
- Compare stock replenishment and MRP techniques
- Understand the concept of time phasing
- Define MRP
- Map the flow of MRP
- Detail MRP objectives and functions
- Work with MRP inputs and outputs
- Use bills of material, lead time offsetting, and exploding
- Work with the MRP planning grid calculations

### **Advanced Topics**

- Advanced time phasing concepts
- Dates and time-buckets
- Problem of lumpy demand

### **Session 5: Managing with MRP**

- Perform the MRP BOM explosion process
- Define the role of the MRP planner
- Understand the causes of MRP change
- Detail the MRP planning process
- Define the prerequisites for MRP
- Work with the MRP generation
- Understand the types of MRP supply orders
- Detail MRP system action messages
- Perform MRP action message activities
- Define MRP performance policies and methods
- Identify MRP problem indicators
- Develop MRP performance measurements

### **Advanced Topics**

- Planning for scrap and waste
- Low level coding overview
- MRP pegging
- MRP and service order management
- MRP in the make-to-order environment

### **Session 6: Mid-Term Exam**

### **Session 7: Capacity Planning and Management**

- Define capacity management
- Detail the elements of capacity management
- Understand the relationship between planning and controlling priorities and capacities
- Understand the four levels of capacity management
- Define capacity requirements planning (CRP)
- Understand the flexibility of capacity and scheduling
- List the objectives of capacity planning
- Detail the inputs into capacity management
- Describe the steps to effectively managing the capacity process
- Detail of the components of capacity management
- Calculate work center capacity
- Calculate work center load
- Schedule work center operations
- Manage the load versus capacity report
- Manage excesses and shortages in capacity

### **Advanced Topics**

- Calculating efficiency and utilization
- Finite and infinite loading
- Manufacturing environments and capacity
- Process flow scheduling

### **Session 8: Production Activity Control**

- Define production activity control (PAC)
- Detail the goals of production activity control (PAC)
- Detail the characteristics of PAC systems
- Understand the linkage between PAC and the planning system
- Work with PAC database files
- Work with the major activities of the PAC system
- Detail the manufacturing order release process
- Detail PAC scheduling activities
- Explore PAC scheduling priority rules
- Detail PAC data collection and monitoring activities
- Understand the purpose of PAC control and feedback activities
- Detail order disposition and closeout activities

### **Advanced Topics**

- PAC control and feedback process steps
- Types of manufacturing order
- Characteristics of good PAC performance measurement
- Relationship of PAC with other functions

### **Session 9: Advanced Scheduling**

- Detail the two types of scheduling
- Define MRP-push system and lean-pull system scheduling
- Define scheduling components
- Work with MRP-based scheduling inputs
- Manage order schedules
- Work with scheduling functions
- Understand planner order release and scheduling
- Use the dispatch list
- Detail the steps in the rescheduling process
- Resolve schedule conflicts
- Work with order status and work center load reports
- Use operation overlapping and lot-splitting techniques
- Schedule bottleneck work centers
- Manage scheduling with input/output reporting

### **Advanced Topics**

- Production planner's planned order display
- Capacity check, scheduling, and release
- Theory of constraints (TOC) scheduling

## **Session 10: Lean Production Management**

- Define lean and just-in-time (JIT) concepts and practices
- Trace the evolution of the lean concept
- Detail the advantages of implementing lean
- Understand the structure of lean manufacturing
- Define the concept of process waste
- Use lean to standardize manufacturing processes
- Explore the elements of “lean thinking”
- Define employee involvement and empowerment
- Explore the components of lean production concepts and practices
- Work with lean plant layout design
- Understand the basics of the lean production pull system
- Define kanban production techniques
- Execute a two-card kanban production flow
- Understand the connection between MRP and lead scheduling techniques
- Use lean to develop the “customer-focused” organization.

### **Advanced Topics**

- Calculating takt time
- Calculating kanban cards
- MRP push-based versus lean pull based systems

## **Session 11: Final Exam**