



APICS PRINCIPLES OF OPERATIONS MANAGEMENT TOPIC OUTLINE

CONCEPTS AND APPLICATIONS

About this Topic Outline

This outline details the concepts and applications covered in all five of the APICS Principles of Operations Management courses. Professionals interested in Principles will find this is a helpful reference and may use it to identify the course details and topics for each of the five Principles courses. If you have any questions, please contact APICS Customer Service at service@apics.org.

I. Principles of Inventory Management (PIM)

Session 1: Operation Management – Foundations

- Define the science and practice of operations management (OM)
- Answer the question why OM should be studied
- Describe how today's business trends are driving operations management
- Discuss the role of operations management in the organization
- Define the value-added activities performed by OM
- Describe how OM fits into the organization
- Describe the functions performed by OM
- Describe how OM has changed over the decades
- Outline the role of OM and business strategy
- Identify how OM contributes to business strategy
- Discuss how businesses can compete with OM
- Detail the ten strategic decisions of OM
- Identify career opportunities in the field of OM
- Perform an inventory management knowledge self-assessment

Session 2: Fundamentals of Inventory Management

- Define inventory management
- Define inventory management objectives
- Describe the different classes of inventory
- Identify the different levels of inventory management
- Review the characteristics of inventory in the supply chain
- Detail the strategic inventory management process
- Describe the elements of an effective inventory management strategy
- Balance demand and supply objectives
- Contrast the conflicting objectives of inventory management among marketing/sales, finance, and operations
- Understand inventory trade-off decisions
- Describe inventory and demand flows
- Define supply chain inventory and demand flows
- Describe inventory dynamics
- Understand how inventory provides value
- Determine whether inventory is an asset or a liability
- Assess the impact of cash flow and inventory management

Advanced Topics

- Trade-off decisions by item class
- Subclasses of inventory
- Item numbering

Session 3: Purpose and Function of Inventory

- Explain why companies carry inventory
- Define the five functions of inventory and describe their use
- Describe the purpose of decoupling inventories
- Detail the components of inventory decision making
- Use a simple formula to estimate inventory throughput and cycle and pipeline inventories
- Define the elements of inventory cost
- Understand and calculate inventory carrying costs
- Define the elements of manufacturing and purchasing costing
- Calculate the impact of stockout costs on the operation
- Discuss how excess and obsolete inventories affect inventory management
- Work with the five basic methods of inventory valuation.

Advanced Topics

- Measuring inventory throughput
- Cost of preventing a stockout
- Capacity associated costs
- Estimating inventory values
- Calculating order costs
- Inventory valuation methods

Session 4: Inventory Replenishment Management

- Explain the basic functions of statistical inventory management
- Understand the difference between independent and dependent demand
- Define the theory of inventory replenishment management
- Describe the difference between continuous and periodic inventory review
- Describe the inventory replenishment planning process
- Define the seven inventory replenishment methods
- Work with the order point inventory ordering method
- Calculate safety stock
- Calculate the order point
- Calculate a periodic inventory order method
- Calculate the inventory order quantity
- Calculate the economic order quantity (EOQ)
- Review the inventory planning process

Advanced Topics

- Normal distribution diagram
- Characteristics of order point management
- Periodic review exercise
- EOQ exercise

Session 5: Additional Inventory Replenishment Techniques and Inventory Performance

- Work with several advanced inventory management techniques
- Counter uncertainty in supplier delivery times
- Understand and perform planning using time-phased order point (TPOP)
- Define order quantities by item class
- Work with financial statements and inventory
- Calculate relevant inventory turnover ratios
- Define inventory performance management tools
- Understand and work with ABC inventory control
- Establish inventory accuracy tools
- Understand and establish a cycle counting program
- Identify today's electronic inventory data collection technologies

Advanced Topics

- Production noninstantaneous receipt
- Products orders and delivered jointly
- Quantity discount

Session 6: Mid-Term Exam

Session 7: Lean Inventory - Concept and Practice

- Define the concepts of Just-in-Time (JIT) and lean and how they apply to the management of inventories
- Describe the evolution of the lean philosophy and techniques
- Define the core principles of lean
- Describe in detail the three major sources of operations waste
- Describe the lean toolkit of techniques to combat waste
- Differentiate value-added work from waste
- Manage inventory effectively in a lean environment
- Determine lean lot sizes
- Establish a pull system
- Calculate the number and work with kanbans/containers
- Describe the benefits of lean on all levels of the organization

Advanced Topics

- JIT/lean evolution
- Ten cultural and managerial elements of lean
- Impact of lot size reduction
- Lean transformation roadmap

Session 8: Fundamentals of Purchasing

- Define the purchasing function
- Identify purchasing as a key business function
- Describe the categories of purchasing
- Detail the strategic responsibilities of purchasing
- Describe purchasing's detailed responsibilities
- Understand the structure of the purchasing organization
- Describe purchasing's role with other business functions
- Understand the difference between centralized and decentralized purchasing
- Describe the buyer/planner concept
- Manage the make or buy decision
- Create an effective purchasing strategy

Advanced Topics

- Purchasing classification exercise
- Financial impact of purchasing

Session 9: Sourcing Strategies

- Define the sourcing process
- Understand the difference between tactical and strategic buying
- Detail the steps in making the make or buy decision
- Develop a cost avoidance analysis
- Conduct an effective spend analysis
- Distinguish between different types of supplier relationship
- Execute a sole or a multiple supplier sourcing strategy
- Effectively score capabilities and select the optimal supplier
- Work with different supplier pricing alternatives
- Engage in effective negotiations with a supplier
- Understand the elements of supplier contract formulation
- Construct a collaborative program that engages the supplier in product design
- Define supplier relationship management (SRM)

Advanced Topics

- Cost avoidance analysis
- Spend analysis documents
- Pareto chart of percentage by category
- Supplier selection comparison
- Purchase quantity discount
- Supplier relationship characteristics

Session 10: PO Management and Performance Measurement

- Define the purchasing management process
- Manage the procurement database
- Detail the various purchase order methods
- Trace the purchase order flow from requirements identification to purchase order close-out
- Determine the timing of purchase order release
- Using material requirements planning (MRP), reorder point (ROP), and kanban systems for order release
- Establish a vendor managed inventory (VMI) process
- Determine inbound transportation factors
- Perform receiving and order closeout
- Review purchase order status reporting
- Review supplier and internal purchase organization performance
- Work with international sourcing
- Explore the impact of the Internet and computerized technologies on procurement

Advanced Topics

- Supplier rating
- Cost of poor quality
- e-SRM services
- e-SRM processing

Session 11: Final Exam

II. Principles of Operations Planning (POP)

Session 1: Operation 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 an operations planning self-assessment review

Session 2: Planning Foundations

- Understand the basics of business planning
- Describe the dynamics of business planning
- Understand the different levels of planning that occurs with a business
- Understand the planning and control process model
- Describe the features of a business plan
- Understand how the different levels of business planning work with each other
- Work with a business planning process model
- Develop a business mission/vision
- Perform investment planning
- Perform profit planning
- Perform asset and capital planning
- Develop business unit strategies
- Describe the components of a planning architecture model

Advanced Topics

- Generic competitive values
- Enterprise investment plan
- Profit planning
- Asset/capital planning

Session 3: Forecasting

- Define the forecasting function
- Review of the three levels of forecasting
- Define demand
- Explore the universal principles of forecast management
- Understand forecast design and parameter issues
- Detail the forecasting process
- Detail the benefits of forecast accuracy
- Describe the general forecasting techniques and data sources
- Review qualitative, quantitative, and causal forecasting techniques
- Discuss why forecasts fail

Advanced Topics

- Selection of forecasting models
- Pyramid forecasting
- Deseasonalized forecast
- Forecast trend with exponential smoothing (Holt's model)
- Forecast trend extrapolation

Session 4: Demand Management

- Define demand management
- Review the components of demand management
- Place demand management in the MPC system
- Evaluate forecast performance
- Use the measures of forecast error
- Calculate forecast error
- Determine the MAD and standard deviation of forecast error
- Calculate forecast bias and tracking errors
- Define customer relationship management
- Work with customer order management
- Define customer service management
- Explore demand management technology tools
- Define demand management performance

Advanced Topics

- Tracking signal
- Forecast error exercise
- Safety stock calculation
- Customer service gap analysis

Session 5: Sales and Operations Planning (S&OP)

- Define sales and operations planning (S&OP)
- S&OP in the MPC system
- S&OP detailed planning process
- Determine product families
- S&OP planning inputs
- S&OP historical input data
- Summary of S&OP outputs
- Understand the S&OP grid
- Work with the make-to-stock (MTS) S&OP grid
- Work with the make-to-order (MTO) S&OP grid
- Implement the monthly S&OP planning meeting
- Define the benefits of S&OP

Session 5: Advanced Topics

- Executing a S&OP level strategy
- S&OP production resource planning

Session 6: Mid-Term Exam

Session 7: Aggregate Operations Planning

- Review the detailed S&OP process
- Understand the sales and marketing planning processes
- Work with product life cycles and delivery network structures
- Calculate a S&OP product family forecast disaggregation
- Understand the production planning process
- Determine production planning strategies
- Calculate the financial impact of the production plan
- Define resource requirements planning
- Develop capacity and load profiles
- Generate a resource requirements plan
- Understand the inventory planning process
- Calculate a production plan using an inventory target
- Develop the distribution plan
- Determine transportation, warehouse, and equipment and labor requirements

Advanced Topics

- Financial decision – workforce costs
- Financial decision – inventory costs
- Financial decision – total costs

Session 8: Master Scheduling Foundations

- Define master scheduling – principles and concepts
- Understand the role of master scheduling in the MPC system
- Detail the objectives of master scheduling
- Understand master scheduling and the manufacturing environment
- Work with master scheduling approaches
- Detail the inputs to master scheduling
- Review the interaction between sales and operations planning (S&OP) and master scheduling
- Establish planning bills of material
- Understand the master schedule grid
- Work with the master schedule grid and demand management
- Calculate the projected available balance (PAB) in the master schedule grid
- Calculate net requirements in the master schedule grid
- Generate MPS orders
- Calculate available-to-promise in the master schedule grid
- Work with MPS time fences and zones

Advanced Topics

- Managing the rolling master schedule
- Cumulative “look ahead” ATP

Session 9: Master Scheduling Processes

- Define the role of the master scheduler
- Review the causes of master schedule change
- Work with the master scheduling management process
- Work with the forecast
- Manage order requests
- Understand the use of time fences
- Understand types of master schedule orders
- Work with action messages
- Work with safety stock
- Discuss capacity planning methods
- Define the rough-cut capacity planning process
- Calculate the rough-cut capacity plan
- Detail the performance elements of a successful master schedule.

Advanced Topics

- Environmental characteristics
- What is advanced planning and scheduling (APS)?
- Assemble-to-order (ATO) master scheduling

Session 10: Operations Systems

- Explore the importance of information technology
- Detail the role of information technology
- Analyze the technology strategic triangle
- Explore technology organization framework assumptions
- Outline operations planning system assumptions
- Explore how system technology benefits planning
- Define enterprise resources planning
- Trace the evolution of ERP systems
- Analyze the components of today's ERP system
- Compare ERP and "best of breed" software solutions
- Detail the requirements for ERP and system thinking
- Outline the ERP organizational maturity model
- Review ERP and enterprise competitive development
- Detail the benefits of applying ERP systems to the management of the business.

Session 11: Final Exam

III. 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

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

IV. Principles of Distribution and Logistics (PDL)

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 distribution and logistics self-assessment review

Session 2: Introduction to Distribution and Logistics

- Define distribution management
- Demonstrate the components of the supply and distribution channel
- Detail a channel design tree structure
- Describe the various types of channel intermediaries
- Identify the need for distribution channels
- Detail the roles performed by the distribution function
- Define logistics management
- Describe the functions of logistics management
- Explain the components of logistics operations
- Understand the concept and practice of reverse logistics
- Detail the components of an effective logistics strategy
- Explore the guidelines for creating a logistics strategy
- Understand the role of the logistics function in supply chain management

Advanced Topics

- The organization of logistics
- The distribution sorting process
- Value-added role of logistics
- Reverse logistics financial worksheet

Session 3: Channel Network Design

- Define the activities involved in channel network design
- Explain the reasons for supply and distribution channels
- Detail critical channel network design considerations
- Understand channel network design factors
- Outline levels of channel network dependency
- Work with the channel configuration attribute matrix
- Describe several different channel network design options
- Compare distribution network design option performance
- Deploy a framework for channel network design
- Discuss the micro decisions influencing distribution channel design
- Use the factor-rating method for channel network design
- Use the center-of-gravity method for channel network design
- Detail channel demand and capacity.

Advanced Topics

- Global channel facilities
- Delivery network facilitators
- Location break-even analysis

Session 4: Inventory Management

- Define the inventory management function
- Identify the functions of inventory
- Outline the strategic inventory management process
- Understand the characteristics of inventory in the distribution channel
- Trace channel inventory and demand flows
- Identify the components of inventory replenishment
- Describe replenishment ordering techniques
- Understand the order point model
- Calculate order point safety stock
- Determine the replenishment order quantity
- Identify the components of inventory carrying cost
- Calculate the EOQ
- Work with minimum/maximum inventory controls
- Detail the replenishment planning process

Advance Topics

- The periodic review system
- Normal distribution diagram
- Measuring inventory performance
- Calculation order points with supplier lead time uncertainty
- Cycle counting processing

Session 5: Distribution Requirements Planning (DRP)

- Describe distribution channel dependencies
- Detail “Push” system functions
- Detail “Pull” system functions
- Decide what to choose: reorder points or DRP?
- Define distribution requirements planning (DRP)
- Explore time phasing – the heart of DRP
- Understand the DRP planning grid
- Calculate the projected available balance (PAB) and the DRP grid
- Calculate net requirements and the DRP grid
- Review the DRP planned order generation
- Perform PAB and net requirements recalculation
- Explore DRP and the bill of distribution (BOD)
- Outline the DRP planning process
- Perform a full DRP calculation

Advanced Topics

- Fair share allocation
- Using safety stock in DRP
- Using DRP for logistics capacity planning
- Developing a warehouse capacity plan
- Exploring distribution resources planning (DRP II)
- Session 6: Mid-Term Exam

Session 7: Warehouse Management

- Define warehouse management
- Detail warehouse functions – material handling, product storage, order management, and information transfer
- Describe the different types of warehouse – private, public, contract, and intransit
- Explore the basic objectives of warehousing
- Review warehousing strategic decision components
- Use of third party logistics (3PL) service providers in warehousing strategy
- Detail the warehouse operational management process
- Discuss the importance of warehouse work standards
- Describe the warehouse receiving flow
- Examine the functions of warehouse stocking activities
- Illustrating the components of successful warehouse inventory transaction management
- Outline the order picking and shipping flow
- Emphasize the importance of warehouse performance measurements

Advanced Topics

- Specialized warehousing services
- Warehouse strategy steps
- Developing warehouse time standards
- Annual physical inventory and cycle counting
- Approaches to measuring logistics performance

Session 8: Packaging and Material Handling

- Define warehouse design and layout objectives
- Determine warehouse size and capacity
- Describe basic warehouse layouts
- Understand warehouse layout development
- Detail warehouse design layout principles
- List the key principles of materials handling
- Classify the types of storage systems
- Outline large-item or large-volume product storage
- Review small-item or low-volume product storage
- Review automated storage systems
- Discuss stocking inventory in warehouse locations
- Describe dock materials handling equipment
- Describe mobile materials handling equipment
- Define the role of packaging and unitization
- List the key drivers of warehouse automation
- Detail the components of warehouse automation

Advanced Topics

- Cube utilization and accessibility
- The cross-docking warehouse
- Advanced dock door management
- Warehouse space calculation
- Shipping containers
- Environmental impact of packaging

Session 9: Transportation Management

- Define transportation management
- Understand the fundamental principles of transportation
- Detail the principles of transportation operations
- Describe transportation participants
- Outline the load transport aspects of transportation services
- Outline the product storage aspects of transportation services
- Explain the relationship of transportation to other business functions
- Classify the modes of transportation: motor, railroad, air, water, pipelines, and intermodal
- Describe the types of transportation carriers
- Define the functions and impact on transportation of third-party logistics (3PLs)
- Outline the various forms of logistics outsourcing models
- Detail the challenges facing today's transportation industry

Advanced Topics

- Private fleet management
- Choosing a logistics service provider (LSP)
- Advantages and risks of a logistics service provider (LSP)

Session 10: Transportation Operations

- Describe the principles of transportation operations
- Review the role of transportation administration
- Detail the types of transportation risk
- Outline the components of the transportation management process
- Classify the elements of transportation cost
- Review the detail components of transportation cost
- Understanding transportation rates and pricing
- Explain domestic transportation terms of sale
- Detail the steps in transportation mode selection
- Detail the steps in transportation carrier selection
- Review transportation routing and scheduling functions
- Review transportation documentation and post-shipment processing
- Outline transportation performance management
- Define transportation management technologies

Advanced Topics

- Transportation risk mitigation - methodology
- Transportation rates and pricing
- Transportation rate negotiation
- Transportation contract estimating
- International terms of sale

Session 11: Final Exam

V. Principles of Managing Operations (PMO)

Session 1: Operations Management Foundations

- Define the science and practice of operations management (OM)
- Answer the question why OM should be studied
- Describe how today's business trends are driving operations management
- Discuss the role of operations management in the organization
- Define the value-added activities performed by OM
- Describe how OM fits into the organization
- Describe the functions performed by OM
- Describe how OM has changed over the decades
- Outline the role of OM and business strategy
- Identify how OM contributes to business strategy
- Discuss how businesses can compete with OM
- Detail the ten strategic decisions of OM
- Identify career opportunities in the field of OM
- Perform a managing operations knowledge self-assessment

Session 2: Operations and Processes

- Define organization, operations, and processes
- Define a process
- Detail the flow of a process
- Understand the difference between products and services
- Define an operation
- Determine the difference between processes and operations
- Discuss the relationship of processes and the customer
- Review the place of different types of customers in the supply chain
- Identify customer wants and needs
- Match customer wants and needs with process solutions
- Detail the scope of process management
- Understand the organization as a network of functional processes
- Map the process-driven organization
- Explain team-based process networking
- Describe the strategic impact of processes and operations
- Outline and work with the four Vs of processes

Advanced Topics

- Evolution of process and operations management
- The three levels of processes and operations

Session 3: Project Management

- Define project management
- List the components of a project
- Describe the four objectives of a project
- Detail project goals dynamics
- Contrast managing ongoing operations and project management
- Outline the project management system
- Define the phases of the project management life cycle
- Review the project positioning phase
- Review the initiation and planning phase
- Review project human resource management, roles, and responsibilities
- Construct a project schedule
- Review the execution and control phase
- Review the completion phase
- Understand the Gantt chart
- Plan projects with CPM and PERT
- Work with CPM and PERT scheduling examples

Advanced Topics

- Contrast ongoing operations and projects
- Review EVM Gantt chart and spreadsheet
- Manage project risk
- Perform an AON critical path method (CPM) network schedule exercise

Session 4: Product Design and Development

- Describe the life cycle of products
- Detail the drivers of new product development
- Understand the principles of product development
- Describe the product design organizational structure
- Review the changing paradigms in product design development
- Explore the steps linking product design and processes
- Work with the product design process flow
- Perform a break-even analysis
- Perform a make or buy analysis
- Define quality functional deployment (QFD)
- Explore the House of Quality
- Explore the four Houses of Quality
- Detail product design techniques
- Review service design and development

Advance Topics

- Build a new product base-case financial model
- Explore the Taguchi loss function

Session 5: Process Design Strategies

- Define process design
- Detail the factors influencing process design
- Describe the different process choices
- Outline transformation process types
- Perform process design – core design structure
- Determine the cost equalization point (CEP)
- Interpret the cost equalization point (CEP) graphic
- Define process layout design
- Detail the factors driving process layout design
- List the various process layout options
- Position process choices with layout choices
- Describe hybrid process layouts
- Investigate production cells
- Maximize process layout efficiency

Advanced Topics

- Little's Law and process design
- Types of processing equipment
- Impact of automation on processes
- Processing equipment systems
- Production technology systems

Session 6: Mid-Term Exam

Session 7: Total Quality Management

- Define quality
- Discuss why quality has become so important
- Detail the dimension of quality
- Review the elements of the cost of quality
- Discuss the hidden costs of poor quality
- Interpret the cost of quality graphs
- Define total quality management (TQM)
- Review the quality management thought leaders
- Outline TQM and strategy
- Determine the TQM program
- Define quality control
- Define continuous improvement
- Define process management
- Describe the elements of design for quality
- Review the elements of employee involvement in quality management
- Position lean process management and TQM
- Outline the components of the TQM tool kit

Advanced Topics

- Quality thought leaders – key statements
- Measuring quality costs
- Measuring product yield and cost
- Quality productivity ratio (QPR)

Session 8: Statistical Quality Control

- Define statistical quality control (SQC)
- Review the statistical quality control system
- Detail the three stages of statistical quality control
- Understand the different types of quality problems
- Explore the range of quality problems
- Understand process variance
- Describe the patterns of variability
- Review process capability ratio and index calculations
- Define statistical process control (SPC)
- Define inspection
- Review the basics of inspection
- Review sampling techniques
- Develop a sample plan
- Understand how to work with x-bar and p-control charts
- Define six sigma quality management

Advanced Topics

- Probability of process error
- Constructing an R-chart
- Constructing a c-chart

Session 9: Process Improvement and Performance

- Define process improvement
- Process improvement paths
- Process improvement dynamics
- Elements of process improvement
- Process improvement methodologies
- Six sigma quality
- Tools for six sigma quality improvement
- Flow charts
- Check sheets
- Histograms
- Cause-and-effect diagrams
- Pareto diagrams
- Scatter diagrams
- Control charts
- Benchmarking
- Balanced scorecard
- Lean kaizen and process improvement
- Sustainability and process improvement

Advanced Topics

- Design of experiments
- A3 problem solving
- Hoshin management
- Obstacles to process improvement

Session 10: Organizational Management and Performance

- Define the objectives of organizational design
- Detail the principles of organizational design
- List the values of organizational design
- Design capable organizations
- Guide the organization through change
- Review change management strategies
- Detail the eight steps of change management
- Understand the role of change leadership and management
- Understand risk terms and concepts
- Manage organizational resiliency
- Detail the tools for managing risk
- Outline workplace management goals
- Review the job characteristics model
- Improve job potential and motivation
- Work with work measurements and standards
- Perform a time study calculation
- Perform a work sampling calculation

Advanced Topics

- Identifying organizational competencies
- Competitive power of an organization
- FMEA exercise
- Finding a time study sample size
- Deriving a time standard from work sampling

Session 11: Final Exam