Appendix O

MANUFACTURING
YOUTH APPRENTICESHIP

PRODUCTION OPERATIONS MANAGEMENT PATHWAY
PRODUCTION OPERATIONS MANAGEMENT (UNIT 8)

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

1. Assist to purchase materials and supplies

Performance Standard Condition

Competence will be demonstrated

at the worksite
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Purchase only from pre-qualified suppliers
Track and maintain order and receipt schedules
Use re-order points to minimize back-orders
Assist worksite professional to inspect raw materials against quality specifications
Report material quality deviations to production
Release materials that meet specification to production
Report receipt of goods to correct parties
Document count and delivery accurately
Report back and documents any material and/or delivery issues to vendors

Learning Objectives

Describe the supplier qualification process
Define logistics
Compare logistics and supply chain management
Describe how logistics is used to keep costs low
Discuss/evaluate logistics industry trends
Explain the process used to manage order, receipt, and delivery externally and internally within a manufacturing facility
Explain the importance of tracking and documentation for inventory control and production processing
Describe how to read bills of lading and routing sheets
Explain how automated purchasing systems work to minimize waste
Describe how purchasing costs are negotiated

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

2. Receive inventory

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Check containers to check for special handling, damage or contamination of materials
Verify that product matches the packing slip and original purchase order and description
Unpack containers as required
Identify any defective materials
Notify appropriate parties and takes appropriate corrective action when defective materials are identified
Store inventory received according to any special handling and production requirements
Store and/or dispose of packing material as required
Update records to document receipt

Learning Objectives

Identify the main types of inventory
Identify the elements of a supply chain
Explain how to read a production schedule and manufacturing work order

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

3. Manage inventory levels

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Assist worksite professional to monitor master production schedule and inventory master file for ordering levels

Check that proper storage levels are maintained

Check that cycle counts for raw and finished goods meet established standards

Rotate raw materials and stock to minimize old and outdated inventory

Help prepare and distribute monitoring reports in a timely way

Assist worksite professional to perform inventory checks

- Do physical count for each item
- Use correct unit of measure to record inventory results
- Assist with inventory inaccuracies investigations

Keep inventory movement to a minimum

Learning Objectives

Explain the purpose of an inventory plan

Identify the costs of maintaining inventory

Define buffer management

List methods of productivity measurement and just-in-time inventory control

Explain the purpose of a physical inventory

Explain methods and reasons for monitoring inventory accuracy

Discuss the timing of inventory audits to production requirements

Describe your facility's policy in the event of inventory shortage

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

4. Distribute materials and products

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Monitor location of pieces/products during production
Verify that most appropriate and cost-effective carrier or method is used to distribute product
Arrange for material or product transport
Handle order in manner to prevent damage
Ensure product is shipped on time
Track shipping of products sent
Document shipping activities
Assist worksite professional to follow up with customer to ensure no customer complaints about the shipment or damaged goods
Assist worksite professional to process claims as applicable

Learning Objectives

Explain the process used to manage order, receipt, and delivery externally and internally within a manufacturing facility
Explain the importance of tracking and documentation for inventory control and production processing
Identify the main methods of transporting products
Describe the role of the government in transportation of goods
Interpret tariffs
Compare packing materials to determine the safest and most cost-effective method of shipping
Discuss how to schedule logistic functions with respect to production requirements and production levels

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

5. Assist to develop inventory forecasts

Performance Standard Condition

Competence will be demonstrated

at the worksite OR in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Research to determine viability of ventures for sources of materials and services
Evaluate internal/external, local/global environments for threats or opportunities (economic, geography, history, political, competition, regulatory, cultural, technological)
Compare costs/benefits of utilizing local, national and/or international markets
Develop forecasts
Set lot sizes, inventory levels and order lead-time
Document forecasts using graphs and charts in written reports or master file for ordering levels

Learning Objectives

Identify major local, national and international trade regions
Define terms associated with trade regions
Construct an import flowchart
Construct an export flowchart
Explain the purpose and function of an inventory forecast
List the types of data needed for inventory forecasting
Define lot size, inventory level, re-order point and lead-time
Explain the importance of the maintaining inventory levels to minimize inventory value
Identify factors/variables for what, when and how much to order
Describe the costs involved for excess inventory, back orders, etc.
Discuss factors used to determine order lead-time
Determine most appropriate demand forecasting method

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

6. Maintain inventory records

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Select appropriate forms/records
Code documents as required
File forms/records in appropriate location
Retrieve and replace files in correct position
Add, Edit, Verify and Query data in electronic files if applicable
Use appropriate computer codes, formatting, macros, charts, spreadsheets, etc.
Verify data prior to entry/storage
Maintain files

Learning Objectives

Demonstrate how electronic data is manipulated such as in a spreadsheet system
Explain how data and files are backed up
Identify and explain the role and function of software management systems
Explain how planning software and systems (Distribution Resource Planning (DRP), Enterprise Resource Planning (ERP), Materials Requirements Planning (MRP), and Warehouse Management System (WMS)) are utilized to manage logistics planning

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

7. Assist to develop a production plan for customer order

Performance Standard Condition

Competence will be demonstrated

at the worksite OR in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.

while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Review the scope and phases of the order with worksite professional

Participate in the following planning activities to develop and implement a production plan as able

- Map production flow of materials and processes
- Review the master production schedule
- Identify customer requirements
- Choose production strategy
- Develop schedules
- Manage and evaluate financial costs
- Identify interdependencies
- Identify critical milestones
- Coordinate work between departments
- Track critical milestones
- Track changes to production plan and costs
- Report resource plan status

Learning Objectives

Define the following resource planning terms: lean manufacturing, just-in-time production, process flow, lead time, build to demand, kanban, work cell design, and push-pull systems

Compare and contrast the different types of production process flow design advantages, constraints, and costs

Describe the purpose of a master production schedule

Relate the master production schedule to the customer order resource plan

Compare production strategies "make to stock" vs. "make to order"

Explain the impact of production, services, and maintenance on resource planning

Describe equipment specification issues and their impact on resource planning

Describe facility design issues and their impact on resource planning

Describe how new order requests are planned

Explain the impact of global trade on the order planning process

Explain supply chain management

Describe the role of sales and marketing operations in your facility

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

8. Assist to record and summarize financial data

Performance Standard Condition

Competence will be demonstrated

at the worksite
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Assist worksite professional to process financial information such as bills of lading, accounts receivable, and accounts payable records
Calculate and summarize costs
- Estimate required resources including staff time, staff training, equipment time, equipment maintenance and repair costs, support services and staff required, facility modifications
- Estimate raw materials quantities needed including costs associated with handling, shipping and transport
- Estimate time requirements with times for approvals, delays, and repairs

Build an estimated budget for the production process
Assist worksite professional to prepare financial reports as requested

Learning Objectives

Define cost estimating, cost justification, cost rollup, and activity based costing
Describe the costs and need for sales and marketing in manufacturing
Compare tangible versus intangible costs and benefits in production
Define accounts receivable and accounts payable
Compare the objectives of lean manufacturing to cost containment and customer satisfaction
Describe how to calculate costs associated with staff, equipment, facilities, and raw materials
Explain how production timetables are developed from planning for required tools, materials, equipment, numbers of workers needed, and cost projections
Define types of payment in international trade

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

9. Assist to coordinate work schedules and duty assignments

Performance Standard Condition

Competence will be demonstrated

at the worksite
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Determine amount of staff needed for services
Schedule staff according to hours required according to employee status and service coverage required
Schedule staff to minimize labor costs
Incorporate coverage for vacations or leaves
Communicate schedules to staff
Maintain changes to master schedule with worksite professional

Learning Objectives

Describe how budgeting is used to determine staffing levels
Describe how labor hours are calculated for levels of production in manufacturing
Distinguish between fixed and variable staff positions to develop work schedules
Define fixed labor and variable labor as it applies to various positions
Discuss how staff are scheduled in accordance with facility needs and staff needs
Describe how staffing levels are determined

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency
10. Use quality tools

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Define question/problem to be evaluated
Determine data analysis tool
Decide which data needs to be collected
Determine when and how to collect data
Collect data
Organize data using quality tools
- Check Sheet
- Pareto Chart
- Scatter Diagram
- Histogram
- Cause/Effect Diagram
- Flowchart
- Control Chart

Analyze data collected

Learning Objectives

Explain the purpose of quality tools
Identify the roles of management and workers regarding quality
Relate quality to internal and external customer needs
Explain the importance of producing quality products at the lowest possible cost
Determine how quality monitoring processes are built in to produce a quality product
Compare the 7 quality tools for purpose and best time to use
Explain the purpose of data collection and analysis to quality
Identify statistical tools used in process improvement

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

11. Calibrate tools and equipment (W/S)

Performance Standard Condition

Competence will be demonstrated

at the worksite OR in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.

Performance Standard Criteria

Performance will be successful when learners:

Follow schedule to calibrate tools and equipment
Check tool/equipment certification regularly by reviewing documentation and through observation of use
Clean and adjust instruments before calibrating
Calibrate tools and instruments accurately and correctly
Promptly re-calibrate tools out of calibration or sent out for recalibration repairs according to procedure
Label tools and equipment that have been calibrated
Document all calibration activities

Learning Objectives

Define calibration and how it is performed
Compare and contrast accuracy versus precision
Explain tolerance
Describe how tolerances and precisions are developed for a piece/product
Explain how calibration precision and schedules are determined
Describe the proper use of selected precision measurement tools
Explain how to determine and control potential sources of measurement error
Discuss how to apply calibration methods to control product and process characteristics

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

12. Assist to analyze production process for productivity

Performance Standard Condition

Competence will be demonstrated

at the worksite OR in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Assist worksite professional/team to evaluate a production process
Use quality tools
Analyze the process to identify staff, tools, equipment, materials, environment, training, safety requirements, and procedures required to produce product
Calculate productivity and/or cycle time for the process
Assist worksite professional/team to identify gaps and brainstorm solutions in productivity

Learning Objectives

Identify trends in manufacturing
Describe potential impacts of current trends
List the major stages involved in producing products
Identify resources needed for production
Explain the impact of material specifications and delivery schedules to all internal and external customers
Identify factors that influence which production processes and technology are used
Describe how efficiency increases productivity
Explain how processes are designed around customer needs and product specifications
Compare and contrast advantages and disadvantages of different types of production principles such as Lean, Mass, Batch, Unit, Continuous, Kanban, Kaizan, etc.
Discuss how staffing, equipment, materials, and environment are analyzed in developing production processes
Explain the role of production in ensuring efficient use of resources
Calculate productivity and/or cycle time
Compare manual production with computer integrated manufacturing (CIM)
Explain how staff training and safety requirements impact production processes

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

13. Monitor operations for product and process quality

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Review process control data to ensure process is meeting product specifications
Evaluate process cycle time to ensure that customer and facility needs are met
Sample and test materials and products to ensure they meet customer specifications
Regularly compare current equipment performance to optimal equipment operations
Investigate and report abnormal equipment conditions in a timely manner
Continuously monitor equipment that is corrected to ensure that the corrective action solved the problem
Use quality tools and methods to monitor operations
Document all quality monitoring activities

Learning Objectives

List the key elements of a quality system
Describe the purpose of Standard Operating Procedures (SOPs) and version control
Define statistical distributions
Calculate mean, median, mode and standard deviation
List possible sources of variation inherent in data collection
Compare and contrast process vs. product control
Explain the main functions of feedback control as it is used in quality control
Identify the purpose of a control chart
Explain ways to spot data inaccuracies and respond to them
Describe how to create control charts (variables and attributes)
Describe different methods of destructive and non-destructive product testing

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

14. Assist to investigate root causes of product and/or process failure

Performance Standard Condition

Competence will be demonstrated

at the worksite
while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when learners:

Participate on team investigation
Gather data as it pertains to the problem
- magnitude
- location
- timing

Review all relevant data and quality monitoring tools
Develop a detailed description of the problem or process failure
Develop a timeline or sequence of events to identify potential contributory relationships
Explore solution options
Take corrective action

Learning Objectives

Identify conditions that require preventive or corrective actions
Identify when to use preventive action and when to use corrective action
Describe the process of reporting and documenting preventive and corrective actions
Discuss why preventive/corrective records must be retained
Compare common root cause analysis techniques
List common categories of root cause classification such as materials, equipment, machine, environment, manpower, etc.

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

15. Take corrective action to restore or maintain quality

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Apply problem solving steps to reported production issues

Use quality tools

Review previous documentation on similar production issues to identify possible solutions

Create an improvement plan at the worksite

Determine appropriate action for sub-standard piece/product

Correct the piece/product and/or process to meet quality standards and bring process back into control

Communicate quality problems

Suggest continuous improvements to process, piece/product, and/or maintenance to improve production and/or reduce waste

Document corrective actions and their outcome

Corrective actions occur in a timely manner

Corrective actions are supported by data

Continually monitor corrective action to validate effectiveness

Learning Objectives

Define Closed loop corrective action

Explain the process for root cause failure analysis

Categorize defect types to determine root cause

Know Pareto analysis to identify priorities for solving multiple sub-standard product problems

Comments:

Unit 8: Production Operations Management Pathway
Production Operations Management

Competency

16. Participate in quality improvement processes

Performance Standard Condition

Competence will be demonstrated

at the worksite

Performance Standard Criteria

Performance will be successful when learners:

Use quality tools to map a production process
Identify performance and training issues related to quality
Identify performance indicators that should be monitored
Assist worksite professional to monitor production operations, equipment, and/or operator performance measures for product and process quality
Review quality measures for trends
Assist worksite professional to perform periodic internal quality audit activities including testing of raw materials, of product at different production stages, and prior to final release
Document the results of quality tests or audits
Assist worksite professional to evaluate customer feedback
Participate in the creation of an improvement plan
Improvement plan clearly outlines change
Improvement plan is supported by data

Learning Objectives

Explain why facilities become involved with improvement processes
Define continuous improvement
Explain the purpose of quality management systems
Describe the impact of Total Quality Management (TQM) principles and ISO9000 certification in manufacturing
Describe inspection and auditing procedures
Identify methods of inspecting materials, processes, and final products
Explain the purpose of documentation and record keeping for inspections
Explain the purpose of a quality audit
Describe the procedures of a quality audit
Describe how audit results are reported
Explain how to develop quality procedures, check lists and methods using standards

Comments: