MARIETA GLAS
CONSULTING & TRAINING

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Authorised Education Provider

Principles of Production & Inventory Management – PPIM

PPIM course sessions.

1. Manufacturing Strategies & Resource Management	11. Lean and Waste Elimination
2. Product Development Cycle	12. Purchasing & Procurement
3. Forecasting and Forecasting Techniques	13. Fundamentals of Inventory Management
4. Production Planning and Master Scheduling	14. Inventory Methodologies & Lot-Sizing Techniques
5. Materials Planning	15. Quality Strategies
6. Capacity Planning	16. Warehousing & Materials Handling
7. Project Management	17. Facilities Location & Transportation
8. Executing Push Systems	18. Distribution Management
9. Executing Pull Systems	19. Final Examination
10. Mid-Term Examination	

Public Classes commences Monday 17 July 2017 - 30 October 2017, every 2nd Monday 08:00 - 16:00

57 hours in total.

PPIM summary of the course content and outcomes

Session One: Manufacturing Strategies and Resource Management	
Contents	**Outcomes**
➢ Long-Range Planning ➢ Medium-Range Planning ➢ Short-Range Planning ➢ Volume/Variety Mix ➢ Manufacturing Strategies ➢ Product Positioning Strategies ➢ Process Strategies ➢ Alternate Plant Layouts	➢ With the aid of a flow diagram, give a description of the manufacturing planning and control process ➢ Distinguish between long-range, medium-range and short-range planning, and give examples of each when planning a company's manufacturing strategy ➢ Compare and contrast the various production planning strategies and give examples of where each could be appropriately employed ➢ Compare and contrast the four product positioning strategies and give examples of products and services provided by each ➢ Distinguish between the four process strategies and name the product positioning strategy supported by each process strategy ➢ Give a description of the three capacity planning strategies and link each with a suitable product and process strategy ➢ Name the alternate process strategies and give examples of where each could gainfully be employed ➢ Explain the concept of group technology [GT] and its use with alternate process strategies

Session Two: Product Development Cycle

Contents	Outcomes
➢ Product Life Cycle Concept ➢ Order Qualifiers and Order Winners ➢ The Product ➢ Product Development Cycle ➢ Quality Function Deployment ➢ Value Engineering and Value Analysis ➢ Break-Even Analysis ➢ Cost Equalization Point ➢ Make-Buy Analysis ➢ Ergonomics ➢ Productivity and Productivity Improvement ➢ Changes in Productivity Levels ➢ Work Study ➢ Work Measurement Techniques	➢ With the aid of a sketch, outline the stages of the product life cycle concept ➢ Distinguish between order qualifiers and order winners; give examples from each category for a typical consumer good ➢ Distinguish between industrial goods and consumer goods; explain the distinguishing factors between each ➢ Name the phases of the product development cycle and give a brief explanation of each phase ➢ Explain how break-even analysis and cost/volume/profit relationships assist the product development phase ➢ Outline the factors to be taken into consideration when determining whether to buy a part or make a part in-house ➢ Give an explanation of the role of quality function deployment in obtaining customer input during the product development cycle ➢ Outline the role of productivity and work study in product development; distinguish between method study and work measurement techniques

Session Three: Forecasting and Forecasting Techniques

Contents	Outcomes
➢ What Is a Forecast? ➢ Data Collection and Data Accuracy ➢ Forecasting Techniques ➢ Forecast Demand Patterns ➢ Mean, Median, and Mode ➢ Time-Series Forecasting Models ➢ Seasonality ➢ Forecast Error ➢ Establishing Forecast Accuracy ➢ Safety Stock and Forecast Uncertainty ➢ Customer Service and Forecasting	➢ Define a forecast and explain the role of forecasting in the manufacturing resource planning and control environment ➢ Explain the importance of ensuring the correct method of data collection and application is adopted during the process of forecasting ➢ Distinguish clearly between dependent demand and independent demand; explain how each is handled when forecasting in an MRPII environment ➢ Compare and contrast qualitative forecasting and quantitative forecasting techniques, giving examples of where each might be effectively used ➢ With the aid of graphs, describe the range of demand patterns; relate each to the product life cycle where appropriate ➢ Distinguish between extrinsic forecasting and intrinsic forecasting ➢ Given a set of raw data compile a forecast for each of the quantitative forecasting methods outlined in the course material ➢ Describe the process of tracking a forecast, and identifying any significant deviations between actual demand and forecast demand

Session Four: Production Planning and Master Scheduling

Contents	Outcomes
➢ The Production Plan ➢ Developing the Production Plan ➢ Developing a Make-to-Stock Production Plan ➢ Developing a Make-to-Order Production Plan ➢ Independent and Dependent Demand ➢ Master Scheduling ➢ Time Fences and the Planning Horizon ➢ Developing the Master Production Schedule ➢ Rough-Cut Capacity Planning [RCCP] ➢ Bottom-Up Replanning ➢ Performance Measurements ➢ Rules for Successful Master Scheduling ➢ The Master Scheduler	➢ Compare and contrast the production plan with the master production schedule as tools for planning and scheduling ➢ Distinguish between production planning and master scheduling in a make-to-stock, assemble-to-order and make-to-order environment ➢ Construct a production plan for a make-to-stock and a make-to-order product positioning strategy - determining ending inventory and backlogs respectively ➢ Understand the concepts of the planning horizon and time fences; and outline how these are used in the master scheduling process ➢ Construct a master production schedule for a make-to-stock and a make-to-order product; compare and contrast the differences between the two ➢ Discuss the role and responsibilities of the master scheduler in a typical manufacturing company ➢ Explain the role of resource planning and rough-cut capacity planning in the master scheduling process ➢ Understand the importance of performance measures in controlling and maintaining stability in the planning process

Session Five: Materials Planning

Contents	Outcomes
➢ Defining Materials Planning ➢ Objectives of Materials Planning ➢ Inputs to Materials Planning ➢ Where-Used, Pegging & Low Level Coding ➢ Material Requirements Planning Record ➢ Planned Order Releases and Receipts - Expanded ➢ Multi-level MRP Explosion ➢ Materials Planning Outputs ➢ Uses of the Bills of Material ➢ Performance Measures for MRP ➢ Scrap and Yield in Materials Planning ➢ Introduction to Demand Driven MRP	➢ Name the objectives of materials planning and give an explanation of how each is achieved ➢ Distinguish between dependent demand and independent demand, giving examples from each category ➢ Name the various bill of material formats used by material requirements planning explaining the purpose of each ➢ Construct a simple bill of material for a product with which you are familiar and perform a gross-to-net explosion ➢ With the aid of a series of MRP grids and a set of raw data, demonstrate the process of lead-time offsetting ➢ Given a set of raw data, complete an MRP record and determine the net requirements, planned order receipts, and planned order releases ➢ Give examples from different areas of the business where the materials planning process is utilized ➢ Given a set of raw data, demonstrate how a number of material performance measures can be determined

Session Six: Capacity Planning

Contents	Outcomes
➢ The Capacity Planning Process ➢ Key Terminology ➢ Measures of Capacity ➢ Inputs to Capacity Planning ➢ Capacity Planning Processing Logic ➢ Calculation of Load ➢ Finite/Infinite Capacity Planning ➢ Outputs from Capacity Planning ➢ Adjusting Load and Capacity ➢ Input-Output Control ➢ Performance Measures for CRP ➢ Scrap and Rework	➢ Define capacity and load; explain why the two need to be in balance to ensure productive operations ➢ With the aid of a flow diagram, describe the capacity planning process; naming and giving a brief explanation of each component part ➢ Name the three measures of capacity; given a set of raw data perform a number of iterations to determine capacity requirements ➢ Define efficiency, utilization and productivity; give a description of each and explain how each is determined mathematically ➢ Name the elements of manufacturing lead-time and give a description of each; explain how each influences manufacturing throughput time ➢ Sketch, label, and give a brief description of the capacity funnel. Explain why capacity is measured as the output from a process, not the input ➢ Compare and contrast a number of different load profiles; explain the significance of each in loading and managing shop floor activities ➢ With the aid of a flow diagram, describe how the input-output module is used to regulate the amount of work-in-process at a work centre

Session Seven: Project Management

Contents	Outcomes
➢ Portfolios, Programs, and Projects ➢ Elements of Project Management ➢ 14-Step Approach to Project Management ➢ Project Management Defined ➢ Project Life Cycle ➢ Project Role Players ➢ Project RACI Matrix ➢ Stakeholder Management ➢ Nine Project Knowledge Areas ➢ Developing a Project Network ➢ Establishing the Critical Path ➢ The Project Report ➢ Reasons Why Projects Fail	➢ Give a definition of a project and project management; briefly outline the role of projects and project management ➢ Sketch the "Iron Triangle" and explain how the change in one of the sides of the triangle affects the other two ➢ With the aid of a diagram, describe each of the phases of the project life cycle ➢ Identify each of the project role players, and give a brief explanation of the roles and responsibilities of each ➢ Name the nine knowledge areas of project management as defined in the Project Management Institute's Body of Knowledge ➢ Distinguish between predecessors and successors; explain how these are used when construction a project network diagram ➢ Draw a project plan for a simple project, label all the parts, and perform a forward and backward pass ➢ Give a number of reasons why projects fail; suggest ways in which project failure could be avoided

Session Eight: Executing Push Systems

Contents	Outcomes
➢ Push vs Pull Execution ➢ Defining Intermittent Production Systems ➢ Loading the Factory ➢ Controlling Work Movement through the Factory ➢ Managing Push Execution Systems ➢ Authorizing Push Activities ➢ Overcoming the Hurdles ➢ The Shop Packet ➢ Executing Push Activities ➢ Bottleneck Management ➢ Priority Rules ➢ Input-Output Control ➢ Production Reporting ➢ Material Reporting ➢ Data Collection Techniques	➢ Identify and name the characteristics of a "push" execution system as a means of producing a range of low-volume, high-variety products ➢ Compare and contrast the characteristics of push execution systems and pull execution systems ➢ Name the factors that influence the movement of work through a job shop facility ➢ Name the various documents that are included in the "shop packet;" giving examples of how each document is used ➢ Give a brief description of bottleneck management, outlining the effect that a bottleneck has on throughput time ➢ Compare and contrast a range of priority rules for job shop scheduling; execute an iteration of each ➢ Explain - with use of examples - how the input-output control report is used to regulate the amount of work-in-process at a work centre ➢ Outline the various processes and methods used to report on feedback from job shop operations

Session Nine: Executing Pull Systems

Contents	Outcomes
➢ Push vs Pull Production ➢ Production Pull Systems ➢ Kanbans ➢ Types of Kanbans ➢ Kanban Systems ➢ Scheduling Pull Systems ➢ Line Balancing ➢ Operation Splitting and Overlapping ➢ Executing Pull Activities ➢ Reporting Pull Activities ➢ Data Collection Techniques ➢ Synchronous Manufacturing ➢ Agile Manufacturing ➢ Additive Manufacturing ➢ Adaptive Manufacturing	➢ Compare and contrast a push manufacturing strategy with a pull manufacturing strategy ➢ Give the objectives of a pull manufacturing strategy, outlining the benefits achieved from employing this strategy ➢ Describe the role of Kanbans in a pull manufacturing environment ➢ Describe the Kanban approach to controlling work in a flow-shop manufacturing environment ➢ Distinguish between a two-card and single-card Kanban; name the Kanban rules ➢ Describe the process of line balancing; with the use of an example balance a simple flow line ➢ Distinguish between operation splitting and operation overlapping; suggest where each might be utilized ➢ Give a description of synchronous manufacturing, agile manufacturing, adaptive and additive manufacturing, highlighting the major characteristics of each

Session Ten: Mid-term Examination

Session Eleven: Lean and Waste Elimination

Contents	Outcomes
➢ Principles of Lean Thinking ➢ The Four Thrusts of Lean ➢ Value-Added and Non-Value-Added ➢ 14 Principles of Lean the Toyota Way ➢ Benefits of Introducing Lean ➢ Deming's 15 Characteristics of Lean ➢ Henry Ford and Lean ➢ What Is/Are the Lean Techniques? ➢ Eight Wastes - Muda ➢ Examples of the Eight Wastes ➢ Three New Wastes ➢ Seven Service Wastes ➢ Benefits of Waste Elimination ➢ Waste Management	➢ Give a definition of the terms lean and lean manufacturing; describe the importance of recognizing the benefits of lean manufacturing ➢ Name the five key principles of lean and give a brief description of each principle ➢ With the aid of a flow diagram, describe the five-step process for implementing lean into a manufacturing environment ➢ Name the 14 Principles of Lean as described by Toyota; give a description of each term ➢ Identify a number of lean tools suitable for use in introducing lean into a manufacturing environment; give a brief explanation of each ➢ Define the term waste; describe the eight wastes using examples from a typical manufacturing environment ➢ Name the new wastes; outline the benefits of eliminating waste from the supply chain ➢ Give a brief description of the waste management process

Session Twelve: Purchasing and Procurement

Contents	Outcomes
➢ Purchasing and Materials Management ➢ Purchasing Organization Structures ➢ Purchasing Objectives ➢ Market Research in Procurement ➢ Purchasing Decisions ➢ Make-Buy Purchasing ➢ Supplier Selection Process ➢ Purchasing Specification ➢ Purchasing Cycle ➢ Purchasing Documentation ➢ Black Economic Empowerment [BEE] ➢ BEE in Procurement ➢ Inventory Pricing and Valuation ➢ Stock Valuation Methods ➢ Applying Stock Pricing and Valuation ➢ Interdepartmental Relationships ➢ Future Trends in Purchasing	➢ Describe the relationship that the purchasing department has with other functions within the materials management umbrella ➢ Compare and contrast centralized purchasing with decentralized purchasing; giving the advantages of each ➢ List the strategic, tactical, and operational objectives of purchasing and procurement ➢ Outline how market research is used in the purchasing process; explain haw this could affect the make/buy decision-making process ➢ Name the factors to be considered in selecting a supplier for a specified range of goods and/or services ➢ Describe each element of the purchasing cycle; name the various documents used during the buying of goods and services ➢ Describe the role of Black Economic Empowerment in South African business; and in particular its influence in the field of purchasing and procurement ➢ Name the various pricing methods available for issuing goods to the production process and pricing goods for sale

Session Thirteen: Fundamentals of Inventory Management

Contents	Outcomes
➢ Inventory Value and Price ➢ What Is Inventory? ➢ Types and Functions of Inventory ➢ Inventory Sub-Categories ➢ Inventory Ownership and Control ➢ Inventory Costs ➢ Inventory and Customer Service ➢ Customer Service Measures ➢ Safety Stock Inventory ➢ ABC Classification of Inventory ➢ Control of Inventory ➢ Cycle Counting ➢ Inventory Accuracy Targets ➢ Inventory Performance Measures	➢ Explain what inventory is, and why it is necessary to hold inventory at various points along the supply chain ➢ Name a number of disadvantages associated with holding inventory in the supply chain ➢ Compare and contrast the types of inventory with the functions of inventory ➢ Identify the various categories of inventory costs; give examples from each category ➢ Compare and contrast the measures of customer service and explain the role of inventory in maintaining an agreed level of customer service ➢ Describe the ABC Classification of inventory, and outline how each category is managed ➢ Give an explanation of the various factors that need to be taken into consideration when establishing inventory control procedures ➢ Discuss the importance of having a number of effective inventory performance measures at strategic points along the supply chain

Session Fourteen: Inventory Methodologies and Lot-Sizing Techniques

Contents	Outcomes
➢ Determining When to Order ➢ "How Often" to Order ➢ Establishing Inventory Costs ➢ Order Quantity Cost Comparisons ➢ Order Review Methodologies ➢ Order Quantity Constraints and Modifiers ➢ Lot-Sizing Techniques ➢ Applying a Range of Lot-Sizing Techniques ➢ Quantity Discounts	➢ Distinguish between the factors affecting lead-time for purchased and manufactured items ➢ Outline the effect that supply lead-time has on the quantity of inventory held at various locations along the supply chain ➢ With the aid of a diagram, give an explanation of how the reorder point is used as a trigger for inventory replenishment ➢ Name and give an explanation of the factors to be taken into consideration when determining how often to order ➢ Identify each of the costs of ordering and carrying inventory; explain the importance of controlling these costs ➢ Compare and contrast the various order review methodologies, give examples where each might be appropriately utilized ➢ Distinguish between order modifiers and order constraints, identifying examples from each category ➢ Name the various lot-sizing techniques and perform an iteration using each technique

Session Fifteen: Quality Strategies

Contents	Outcomes
➢ Defining Quality ➢ Quality of Design and Conformance ➢ Quality Gurus ➢ Metrology ➢ Quality Pyramid ➢ Inspection and Inspection Techniques ➢ Quality Management Systems [QMS] ➢ Statistical Process Control ➢ Control Charts ➢ Acceptance Sampling ➢ Cost of Quality ➢ Quality Training ➢ Quality - Making it Work ➢ Quality and Customer Satisfaction	➢ Define quality from the supplier and customer's point of view; explain the importance of quality in both a manufacturing and service environment ➢ Distinguish between quality of design and quality of conformance, outlining the role of each during product design and product manufacturing ➢ Give an account of the contribution made to quality by the early pioneers explaining the contribution each made to modern-day quality control ➢ Discuss the role of metrology and measurement in the field of quality control and inspection ➢ Give an explanation of the role of inspection, and identify a number of inspection methods ➢ Outline the role of a quality management system in a manufacturing environment ➢ Distinguish between control charts for variables and control charts for attributes, giving examples of where each would be used ➢ Distinguish between the cost of good quality and the cost of poor quality. Give examples from each category

Session Sixteen: Warehousing and Materials Handling

Contents	Outcomes
➢ Determining Space Requirements ➢ Warehouse Productivity ➢ Ergonomics ➢ Storage Methods ➢ Storage Equipment ➢ Order Picking Systems ➢ Materials Handling ➢ Function-Oriented Systems ➢ Material Transport Equipment ➢ Conveyors ➢ Cranes and Hoists ➢ Industrial Trucks ➢ Dock Bumpers, Levelers, and Shelters	➢ Explain the importance of an effective warehouse facility layout for the safe storage and movement of goods ➢ Explain why it is important to develop the materials handling system in conjunction with the warehouse layout ➢ Distinguish between the various storage methods giving the principle advantages and disadvantages of each method ➢ Name the various categories of material storage equipment and give examples and applications of each ➢ Give an explanation of the PQRST of materials handling and explain how these factors affect the way in which materials are handled ➢ Discuss the importance of warehouse productivity and the use of ergonomics in promoting effective and efficient warehouse operations ➢ Compare and contrast the various storage methods, citing the advantages and disadvantages of each ➢ Name and describe the dimensions of materials handling and distinguish between the major categories of materials handling equipment

Session Seventeen: Facility Location and Transportation

Contents	Outcomes
➢ Channel Types and Structures ➢ Location Factors ➢ Choosing a Location ➢ Region/Community Selection ➢ Site Selection ➢ Facility Location Models ➢ Transportation ➢ Designing the Transportation System ➢ Freight Management ➢ Operating Costs ➢ Modes of Transport ➢ Other Carriers ➢ Transportation Cost Elements ➢ Unitization ➢ Containerization ➢ Types of Containers	➢ Identify the various levels in the distribution network, and explain the role and functions of each ➢ Name the factors to be taken into consideration when choosing a location for establishing a manufacturing and/or distribution facility ➢ Compare and contrast the qualitative factors and the quantitative factors to be taken into consideration in facility location decisions ➢ Describe the factors to be taken into account when designing a transportation system for the movement of goods from one geographical location to another ➢ Distinguish between not-for-hire carriers and for-hire carriers; give the advantages and disadvantages of each ➢ Compare and contrast the different modes of transportation available for moving goods through the supply [value] chain ➢ Name the various cost elements in the distribution of goods in the supply chain ➢ Discuss the role of containers and containerization in moving goods in the supply chain, distinguishing between the various types of containers

Session Eighteen: Distribution Management

Contents	Outcomes
➢ Distribution Networks ➢ Distribution Network Objectives ➢ Inventory Control ➢ Activities of Physical Distribution ➢ Third-Party and Fourth-Party Logistics ➢ Cross-Docking Operations ➢ Distribution Centre Management ➢ Distribution Requirements Planning [DRP] ➢ What is Distribution Requirements Planning? ➢ DRP and the Marketplace ➢ DRP and Demand Management ➢ Centralized DRP vs Decentralized DRP ➢ Ordering Models ➢ Basic DRP Calculation ➢ Collaborative Planning, Forecasting, and Replenishment [CPFR]	➢ With the aid of a flow chart, give an explanation of the various configurations for distribution systems, outlining the application of each in a typical distribution environment ➢ Name each of the activities of physical distribution; give an explanation of each outlining how they interact with each other ➢ Give an explanation of the role of third party and fourth partly logistics providers in the distribution of inventory ➢ Distinguish between forward integration and reverse integration; suggest why a manufacturing company might engage in either or both ➢ Compare and contrast the push method of distribution with the pull method of distribution, giving the advantages and disadvantages of each approach ➢ Discuss the role of safety stock in distribution management when maintaining a high level of customer service ➢ Describe the distribution requirements planning process, and explain how DRP calculates the demands at each level in the distribution network ➢ Given a set of raw data, show how inventory requirements are managed within a distribution requirements planning system

Session Nineteen: Final Examination

Principles of Production & Inventory Management.

There are various options on how this course could be presented.

Options	Hours per week	Duration
Option 1	3 hours per week	- 3h x 19 weeks - assessments in weeks 10 & 19
Option 2	2 x 3 hours per week	- 6h x 11 weeks - assessment in weeks 5 and 11
Option 3	2 x 3 hours every 2nd week	- 6 hours every 2nd week - assessments in weeks 10 and 19
Option 4	8 hours every day, in two weeks	- 8 hours every day for 5 days - Assessment on day 6 - 8 hours every day for 4 days - Final Assessment on day 11

- Homework of previous session(s) to be done prior to the start of the next class.
- Homework contributes 30% of the final mark, whilst the exam contributes 70% to the final mark.
- The pass mark is 50%, and learners have to pass the final assessment in order to pass the course.
- A minimum of eight- and a maximum of 15 learners per class / group. In the event that the group is smaller than eight a course cost would be based on eight learners.
- All course materials, assessments and training hours are included
- An hourly rate would be payable in the event that additional hours are requested for revision sessions or any other reasons.
- A re-write cost per learner is payable, whether the learner wants to improve his/her marks or in the event that he/she failed.
- A report would be sent to your company at the end of the course which includes the attendance register, weekly and total homework results as well as the final assessment mark. This sheet would also include a short learner report as well as an evaluation form, completed by the learners.
- Prices are exclusive of VAT.

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