Capgemini

Production Planning

Lesson 1 : Production Planning Overview

Lesson Objectives

Objectives -On successful completion of this training module, you should have:

- Understood the basics of SAP Production planning
- Become familiar with basic SAP Terms on PP
- Gained enough idea on PP Organization Structure
- Understood the core functions of Production Planning and Shop floor control.

`

2

Add instructor notes here.

Training Agenda

- PP Overview Details
- PP Master data Overview
- PP Process Industry Overview Details
- PP PI Master data Overview
- PP Bill Of Materials
- PP Work Centre
- PP Routings
- PP SOP
- PP Demand Management
- PP MRP
- PP Production Order management
- PP-PI Overview
- PP Repetitive Manufacturing
- PP Variant Configuration Overview

3

Add instructor notes here.
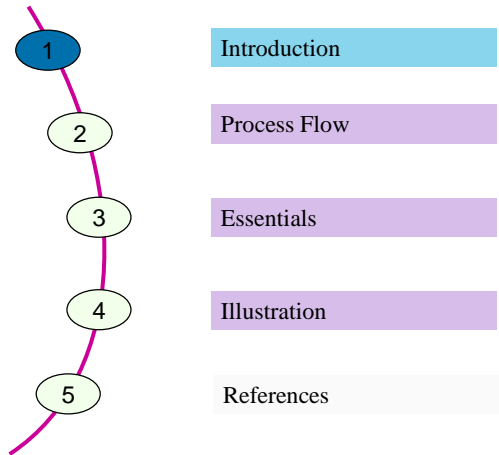
Production Planning Overview

1	Introduction
2	Process Flow
3	Essentials
4	Illustration
5	References
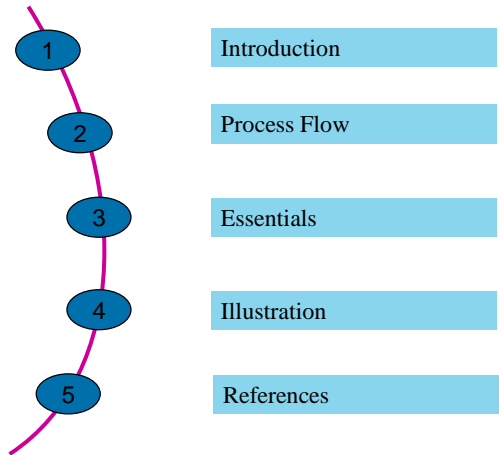
4

Add instructor notes here.

Production Planning Overview

1	Introduction
2	Process Flow
3	Essentials
4	Illustration
5	References

5

Introduction To SAP

SAP stands for Systems, Applications and Products in Data Processing

SAP's ERP (Enterprise Resource Planning) system enables companies to run their business processes, be the accounting, sales, production, human resources or payment, in an integrated environment

SAP's ERP system also facilitates effective utilization of resources (the R in ERP), be it machines, production capacities, manpower or other assets of an enterprise (the E in ERP) through detailed planning (the P in ERP) of resources

Different modules in SAP are:
- FI & CO (Finance and Control)
- SD (Sales and Distribution)
- MM (Material Management)
- PP (Production Planning)
- HR (Human Resources)

6

Add the notes here.

Add instructor notes here.

Introduction to PP

Production planning is a combination of planning and manufacturing activity management for products, in manufacturing organization, to meet sales Requirements.

The manufacturing industries are classified as follows, by considering the production volume:

- Discrete manufacturing – where production lot size is small and will account the production based on lot size. Ex.Customized product manufacturing unit (Pumps)
- Repetitive manufacturing – Where production is measured by rate   like quantity per   day and volume of production is higher than above type and production period also larger than above type. Ex Automotive Industries
- Process industries – Where production is taken place in dedicated   process line for continuous production over entire period. Ex Chemical Industries
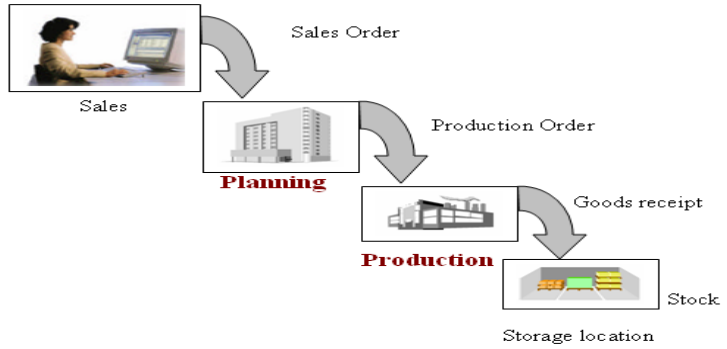
7

Add the notes here.

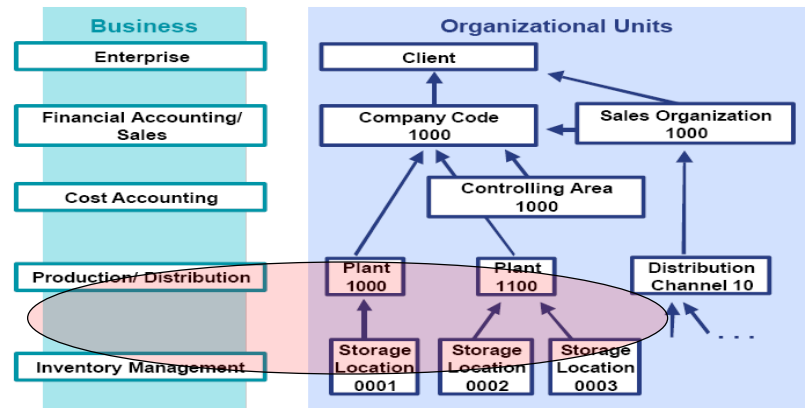# Introduction

The general flow of information is as follows

Purpose

- Plan for production of a material in right quantity at the right time to satisfy the sales requirement within the customer requested date

- To meet purchasing requirements
    (Ex Lot size, lead time)

- To optimize the capacity utilization

9

Organizational Structure

Business	Organizational Units
Enterprise	Client
Financial Accounting/ Sales	Company Code 1000 ← Sales Organization 1000
Cost Accounting	Controlling Area 1000
Production/ Distribution	Plant 1000 — Plant 1100 — Distribution Channel 10
Inventory Management	Storage Location 0001 — Storage Location 0002 — Storage Location 0003

Production planning unit is shown as shaded area

10

Use

The Production planning module is to be implemented, where production activities are part of the Business. This helps in reducing planning time, accurate information about planning, procurement proposals and reporting

Terminology - General

Material master

The material master is a database that contains information on the materials that a
company constructs, procures, manufactures, stores, and sells

Work center

A work center is a location that defines where production activities take place according to order requirements. In different companies, work centers are also known as machine centers or capacity centers

Bill Of Materials

A bill of material is a complete, formally structured list of the components that make up a product or assembly.

Alternate BOM

Another version of BOM used to produce the same finished product

Routing

A routing determines the sequence of individual operations that are necessary to produce a product

Production Resource tools (PRT)

All auxiliary tools used to carry out production like Jigs & Fixtures, Inspection tools etc

12

Terminology - General

Planned Order

Planned orders are results of running MRP. Shortages of materials that are set to internal and external procurement will create planned orders, which can be converted into production orders or Purchase requisition

Production Order

A production order is an order issued within a company to produce a specific quantity of material within a certain timeframe

Order release

Releasing the Order to shop floor to start production

Confirmation

Declaring the completion of Production activities

13

Terminology - General

Goods Receipt

A goods receipt is the physical inbound movement of goods or materials into the warehouse

Goods Issue

A Goods Issue is defined as a physical outbound movement of goods or materials from the warehouse. It results in decrease in stock from the warehouse.

Reservation

Document which contains qty of materials, reserved for particular production Order or Individual requirement. This is created once Production Order is created

Back flush

Automatic issue of components to Production order when Order is confirmed

Settlement

Passing the production cost to next receiving object like sales Order

14

Terminology - General

- **Planning strategy**

  - Planning strategies represent the business procedures for the planning of production quantities and dates.

  - Planning Strategy defines the supply chain model of the business.

  - Planning Strategy is also a set of customer requirements and Production requirements. There are many strategies, defined to take care of scenario like Make to stock , Make to Order scenarios, etc.

  - For make to stock scenario, planned independent requirements will be taken as demand. Planning, procurements and production will be done as per demand. Sales order can be consumed from stock.

  - For Make to Order scenario, Planning and Procurement will take place wrt sales Order only.

Terminology - General

- MRP Run

  MRP run is complete estimation of items in terms of qty, by considering stock

  or and requirements w. r. t. demand. Also it generates the Purchase requisitions

  planned orders w. r. t. procurement type.

- Procurement

  Procurement is the process of finding, agreeing terms and acquiring goods,
  services or works from an external source, often via a tendering or competitive
  bidding process. All procurement proposals are subject to lot size and date of
  requirements.

- Capacity Planning

  by Capacity planning is the process of determining the production capacity needed

  an organization to meet changing demand for its products

16

Terminology - General

- **Production Version**

  The production version is the link between a product BOM (Bill of Material) and the Routing. It determines which alternative BOM is used together with which routing to produce a material or plan a material. There may be different production versions based on the lot sizes and validity dates
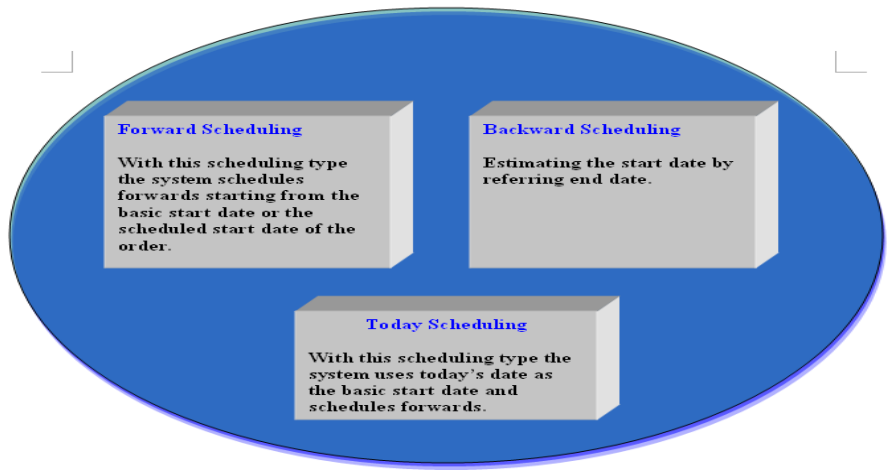
- **Scheduling**

  Scheduling is the process of arranging, controlling and optimizing work and workloads in a production process or manufacturing process. Scheduling is used to allocate plant and machinery resources, plan human resources, plan production processes and purchase materials.
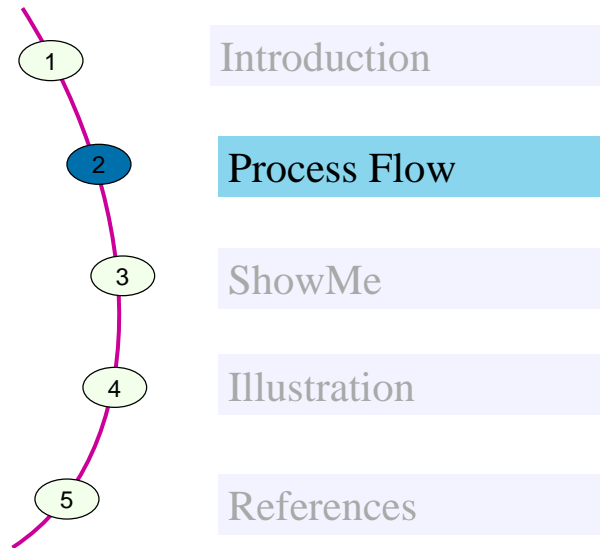
  - There are 3 ways of scheduling
    - Forward scheduling
    - Backward scheduling
    - Today scheduling

Terminology – Scheduling Types

Forward Scheduling

With this scheduling type the system schedules forwards starting from the basic start date or the scheduled start date of the order.

Backward Scheduling

Estimating the start date by referring end date.

Today Scheduling

With this scheduling type the system uses today's date as the basic start date and schedules forwards.

18

Production Planning Overview

1   Introduction

2   **Process Flow**

3   ShowMe

4   Illustration

5   References

19

Strategies – Make to Stock
(Planning with Final assembly (40)

- The required quantities and dates of the planned independent requirements are contained in the demand program. The demand program is one of the main inputs to the material planning process

- For the planning with final assembly strategy, we enter the planned independent requirements (forecasts) at the finished product level. Sales orders for the finished products are entered in the SD module

- Up until the finished product, the production / purchasing process is initiated after running MRP.

- Sales orders are filled from stock

Process

23

Strategies - Make to order

- SAP has several planning strategies that support make-to-order planning
- Make-to-order planning means ware house stock is built up to satisfy the requirements of each sales order. Each product is specially produced when an appropriate sales order is received
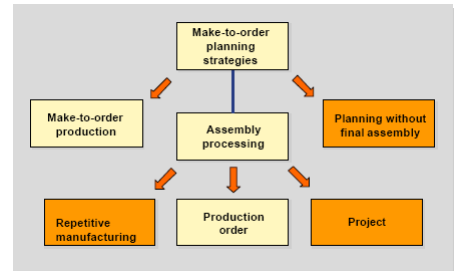
- One of the strategies that will be discussed in this unit is make-to-order production. This is also called strategy 20
- Assembly processing is a part of make-to-order planning. The strategies used here are similar to the other make-to-order strategies, with the exception that they automatically create a procurement element (for example, a production order) when a sales order is received

24

Production Planning Overview

1	Introduction
2	Process Flow
3	**Essentials**
4	Illustration
5	References
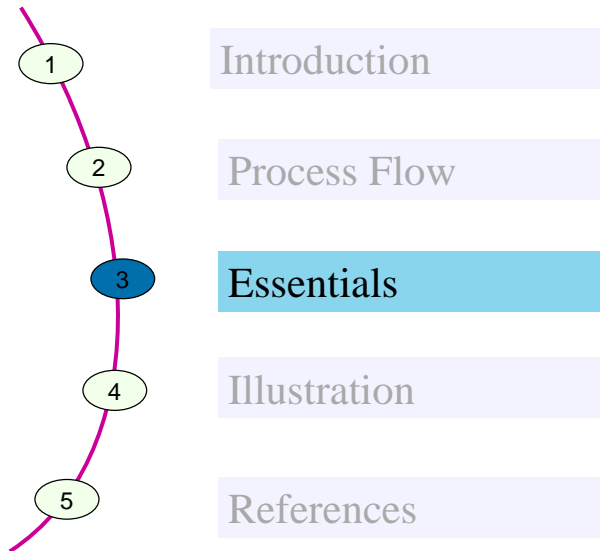
Essentials

In this following is explained in detail:
- Environment
- Prerequisites
- Master Data

26

Environment

Prerequisites

The following modules should be implemented before implementing PP

Make to Stock related scenario

Make To Order related scenario

FICO

MM

SD

HR

PM

QM

Optional

28
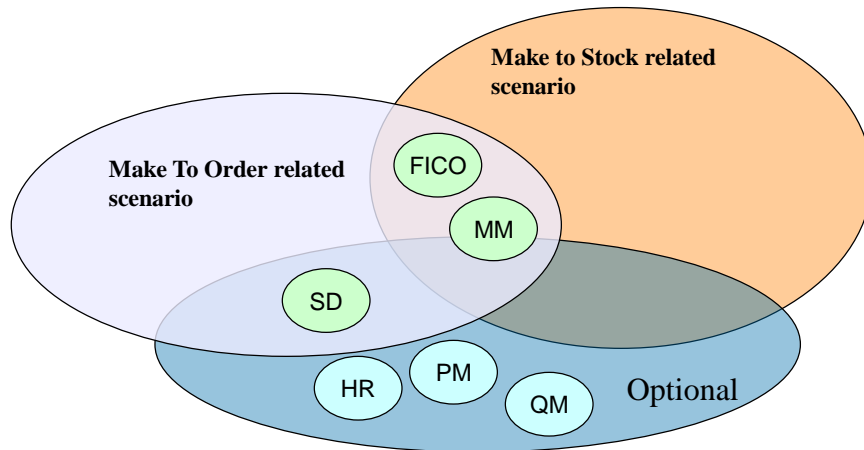
Configuration

Configuration is, setting up of the options to suit the application without modifying the software.

The following are the some important Configurations:

- Basic data
  - All Master data.
- Production Planning.
  - Demand management.
- Capacity planning.
  - Capacity related data for master data.
  - Operations.
  - Evaluations.

- Materials requirement Planning.
  - Order type.
  - Control key.
- Shop Control.
  - Availability check.
  - Scheduling parameters.
  - Confirmation.

29

Master Data

The following are the Master data used in PP
(Details given in next slides)

❖Material master
❖Bill Of materials
❖Work Center
❖Routings
❖Production Resource Tools

30

Master data – Material Master
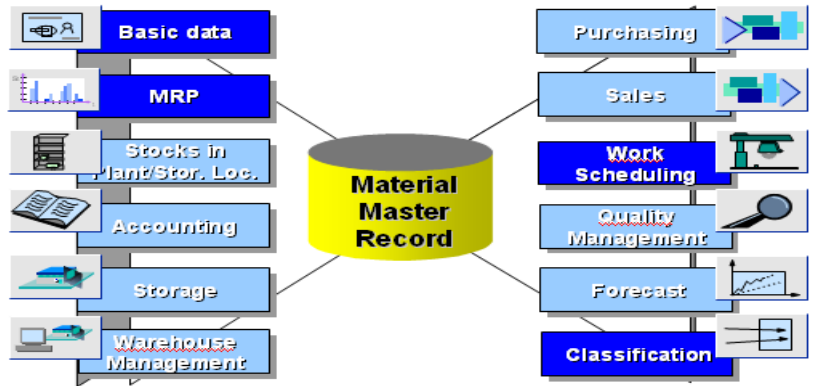
Highlighted are the master data used in PP

31

Master data – Material Master

▪The material master represents the central source for releasing material specific data. It is used by all of the SAP Logistics components in the R/3 System. Integrating all of the material data in one single database object means that the problem of data redundancy is not an issue. The stored data can be used by all areas, such as purchasing, inventory management, materials planning, invoice verification, and so on

▪The data contained in the material master is required, for example, by the following functions in the SAP Logistics component: ordering in Purchasing

▪Updating movement of goods and managing the physical inventory in Inventory Management

▪Posting invoices in Invoice Verification

▪Processing sales orders in Sales

▪Planning requirements, scheduling work in Production Planning and Control

▪ The structural logic that applies to vendors and customers is also valid for material master records

32

Master data – Bill of materials

▪Bill of Materials- In the design department, a new product is designed such that it is suitable for production and for its intended purpose. The result of this product phase is drawings and a list of all the parts required to produce the product. This list is the bill of material

▪BOMs are stored in the SAP System as single -level BOMs

▪A single-level BOM consists of a BOM header and the BOM items

▪Data that refers to the complete bill of material is maintained in the header. Data that refers to a component is maintained in the item

```
                    Pump
        ┌────────────┼────────────┐
     Casing        Shaft      Drive wheel
```

34
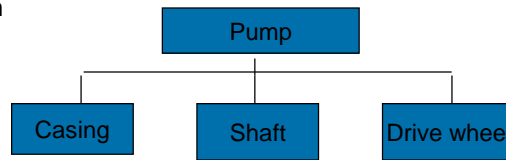
Master data – Bill of materials

- Multilevel BOM
  - A group of semi-finished products or parts that are assembled together and form either a finished product or a component of a finished product is known as an assembly

35
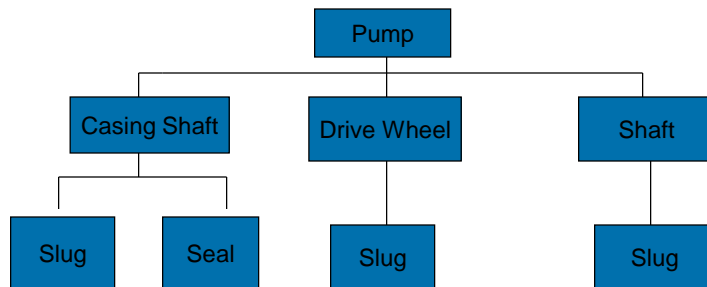
Master data – Work center

- Work center is an organization unit where manufacturing activities are performed.
- Work Center data is used for:
  - Scheduling
  - Costing
  - Capacity planning

Components of Work center are as shown in fig.

Basic data
Contains basic information

Default values
Values to be copied to routing

Capacity
Data about capacity declaration

Scheduling
Formula for scheduling production activities

Costing
Contains costing data
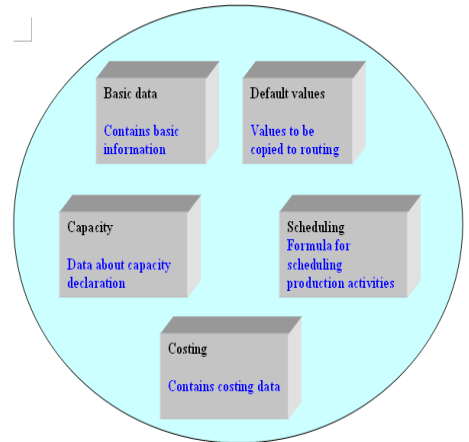
Master data – Routing

- A routing contains the operations to be performed, their sequence and the various work centers involved to manufacture an item

- Routing defines one or more sequences of operations for the production of a material

- To reduce the effort of entering data in a routing, you can reference or copy reference operation sets as many times as required and in any sequence

- Routings are also used in standard cost calculation for finished Product by calculating operational cost of finished product

- Before creating the routing, it is mandatory that Work Centre should be available in the system

37

Master data – Routing view

Display Routing: Operation Details

◀ ▶ 🔁 🖉 | Work center | 👤 Routings | 👤 Sequences | 👤 CompAlloc | 👤 PRT

Material CAR_I   Car   Grp.Count1

Operation

Activity	0010	Suboperation	
Work center	/ Plnt	1121 / 1000	Assembly
Control key	PP01	In-house production	
Standard text key	P000001	Assembly	
		☐ Long text exists	

Work center data

Standard values

		Unit of measure conversion
Base Quantity	1	Header Unit Operat. Un
Operation unit	EA	1 EA <=> 1 EA
Break	0.000	

	Std value	Un	Acty type	Efficiency
Setup	10	MIN	1422	
Machine	25	MIN	1420	
Labor	10	MIN	1421	
Standard value 1	0.000			
Standard value 2	0.000			
Standard value 3	0.000			

Business Process

Operation data

39

Relationship between Master Data

40
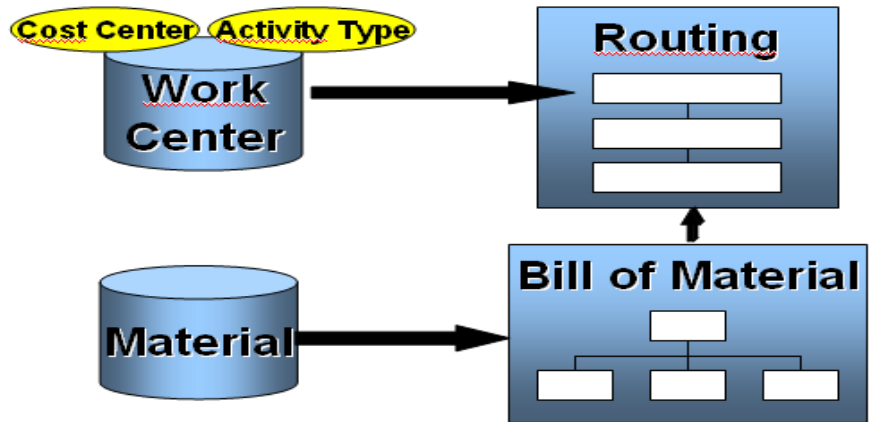
Integration with other modules

The Production Planning module is
having direct data relationship with
other modules as shown. Any
legacy system could integrate with
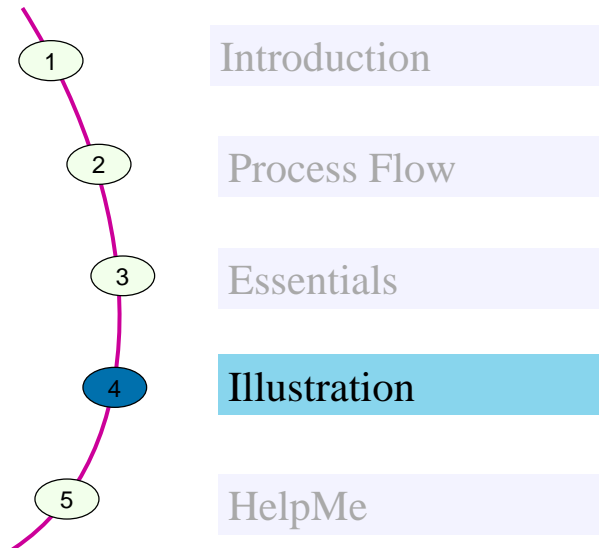PP with necessary settings, like
CAD etc.

41
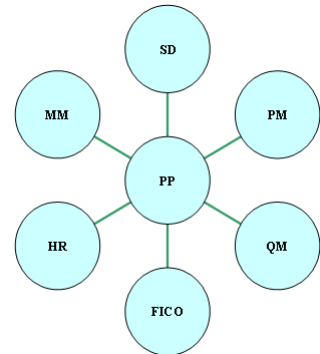
Integration with other modules

Production Planning generally integrate with MM, SD, CO, QM Modules

Production Planning Overview

1 Introduction

2 Process Flow

3 Essentials

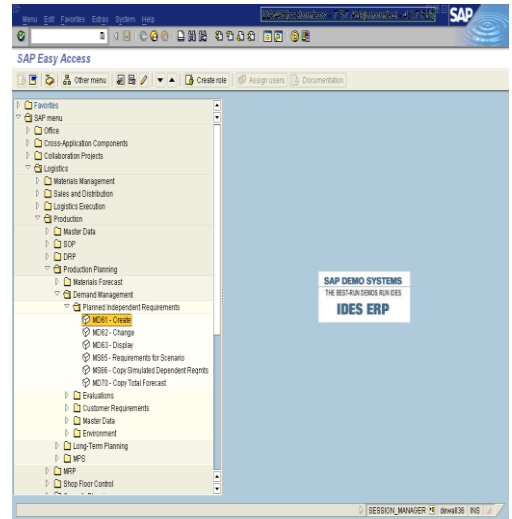4 **Illustration**

5 HelpMe

Log In

Illustration

Step 1

Production Planning

activities starts as given

below.

- 1. Creating demand in case of Make to stock(MTS) scenario. Menu Path :-

  Logistic→Production→Production Planning→Planned Independent Requirements→Create (Tcode MD61) for a finished product

- Referring from Sales information systems/Sales Order in case of make to stock scenario.

Illustration

Step 2

MRP execution

(Material Requirement Planning)

Based on demand like Planned independent requirements in case of MTS or Sales Order in case of MTO, material requirements are planned through MRP run.

Planned Orders for items to be produced at In-house and Purchase requisitions for external procurable items are generated.

Sales orders/
Planned ind. reqm'ts

MRP

Master Data

Generates

Planned order

Purchase requisitions
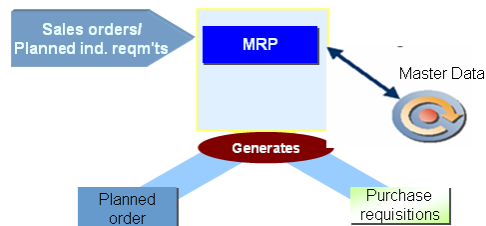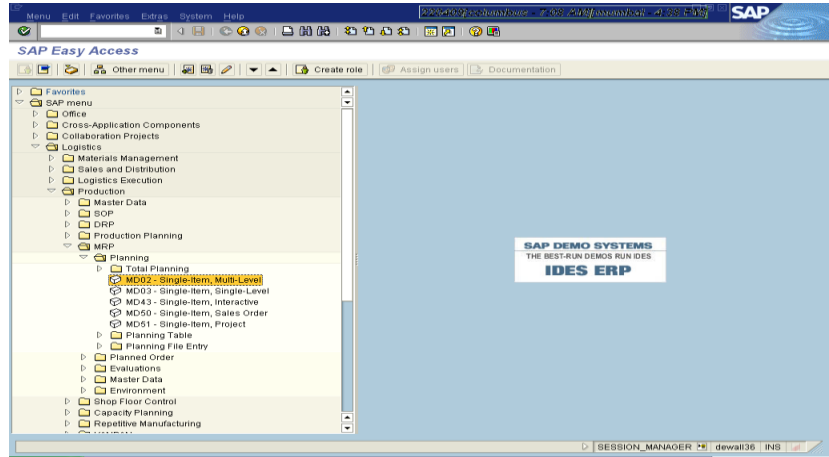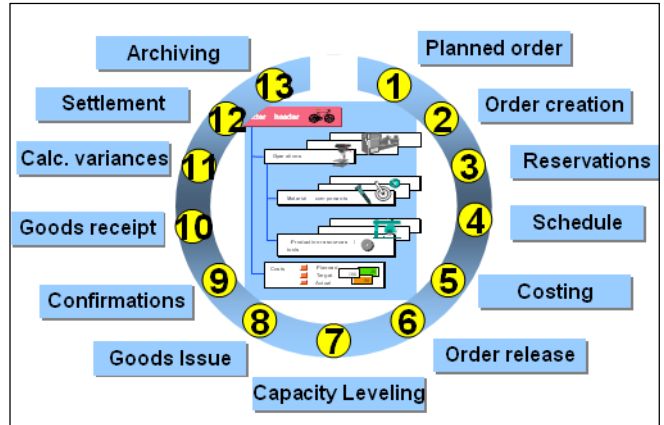
Illustration

Illustration

▪After completing MRP run, system generates planned order for in-house produced material and purchase requisition for externally procured material.

▪Planned Orders are converted to Production order to initialize production activity.

▪Purchase requisition are converted to Purchase orders to initialize procurement activity.
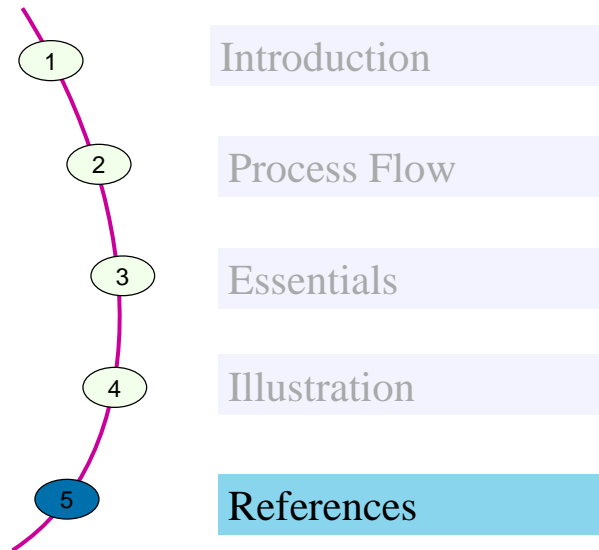
Illustration – Production Order Execution

Step 3

Production Order is executed as shown fig. Step 1 to 6 will be carried out at PP Cycle and 7 to 13 at Shop floor

Production Planning Overview

1 Introduction

2 Process Flow

3 Essentials

4 Illustration

5 References

50

Additional Information

- All customized reports are called Z- reports
- All customized tables are called Z- Table
- All customized transactions are called Z-Transactions

51

Add instructor notes
here.

Summary

SAP's ERP (Enterprise Resource Planning) system enables companies to run their business processes, be the accounting, sales, production, human resources or payment, in an integrated environment

Three types of manufacturing industries- Discrete manufacturing, repetitive manufacturing and process industries

Following steps are involved in Production planning- sales order→ production order→ goods receipt→ stock

Production planning reduces planning time, provides accurate information about planning, procurement proposals and reporting

Planning strategies are mainly divided into 2 scenarios-
- Make-to-stock and Make-to-order

Configuration is, setting up of the options to suit the application without modifying the software

Master data used in PP- material master, bill of materials, work center, routing and PRT

52

Add the notes here.

Add instructor notes here.

Review Questions

1. Before creating the routing, it is mandatory that Work Centre should be available in the system.

   Check whether the statement is true or false

   a. True
   b. False

2. Production Version is a combination of :

   Choose the correct answer(s)

   a. BOM
   b. Work center
   c. Routing
   d. PRT

53

Add the notes here.

Add instructor notes here.

Review Questions

3. Type of scheduling

   Choose the correct answer(s)

a. Forward scheduling
b. Backward scheduling
c. Today scheduling
d. General scheduling

4. Mention the types of Manufacturing industries.

54

Add the notes here.