UNIT I

Syllabus :

1.1 **Traditional Product Cycle Diagram-**Role of Marketing, R&D, Design, PPC, Quality Control and Sales Departments. Disadvantages and Limitations of Traditional Product Cycle.

1.2 **Current Production Needs**- Production Rate, Quality, Accuracy, Repeatability, Flexibility, Survival.

1.3 **CIM**-Concept, Advantages and Benefits of CIM.

1.4 **Elements of CIM**- Computer Aided Design (CAD), Computer Process Planning (CAPP), Computer Aided Manufacturing Control (CAMC), and Computer Aided Business Function (CABF).

1.5 **CAD/CAM/CIM Product Cycle Diagram**- Customer, Marketing, Computer Aided Design (CAD), Computer Aided Process Planning (CAPP), Computer Aided Manufacturing Control (CAMC), Computer Aided Business Function (CABF)

UNIT II

Syllabus :

2.1 **Computer Aided Design (CAD)-**Geometric, Modeling, Finite Element Analysis and Optimization, Evaluation and Design review (CAE), Concept of Concurrent Engineering, and List of software for CAE, Simulation, Automated Drafting and Generation of Report.

2.2 **Computer Aided Process Planning (CAPP)-** Concept of CAPP, Structure of Processes Planning Software, Methods of CAPP-Variant, Generative. Computerized Material Resource Planning (CMRP), Computerized Work Scheduling.

2.3 Computer Aided Manufacturing Control (CAMC)- to generate computer program in machining. Interfacing part program to CNC. Computerized Control Monitoring and Control, Computer Aided Quality Control (CAQC).Programmable Logic Control (PLC), Software List like SCADA etc.

2.4 Computer Aided Business Functions (CABF)-Enterprise Resource Planning (ERP)-role of ERP in business, advantage and applications of ERP software, Material Resource Planning(MRP) –role of MRP in business, advantages and benefits. MRP softwares. Customer Relationship Management (CRM) - role of CRM in business, advantage and applications.CRM software.

2.5 Product Lifecycle Management (PLM) - role of PLM in business, advantage and applications. PLM software.

2.6 Supply Chain management (SCM) - role of SCM in business, advantage and applications. SCM software.

UNIT III

Syllabus :

3.1 CIM Networking-Types of Network and its Characteristics', Applications. Types of Network Topologies-Star, Bus and Ring Topology.

3.2 Component of Networking-Application Software for CIM, Network Software and Network Hardware.

3.3 Data Base Management System (DBMS) - Data Base Types - Hierarchical Data Base, Network Data Base, Relational Data Base, Object Oriented Data Base. Functions of Data Base Management System. Advantages of DBMS.

Syllabus :

4.1 Group Technology - concept, basis for developing part families, part classification and coding with example, concept of cellular manufacturing. Advantages and limitations.

4.2 **Flexible Manufacturing System -** Introduction, concept, definition and need, sub systems of FMS, comparing with other manufacturing approaches.

4.3 **Major elements of FMS -** workstations, material handling and storage system, computer control system and human resource.

4.4 **Classification based on flexibility -** dedicated FMS, random order.

4.5 **Classification based on types of layouts -** inline layout type, rotary layout, rectangular layout, loop layout type ladder layout type.

4.6 Applications and benefits of FMS, advantages and disadvantages of FMS.

UNIT V

Syllabus :

5.1 Automation - Define, need of automation, high and low cost automation, examples of automations.

5.2 Elements of automation - Power source, control unit and feedback control.

5.3 Types of Automations - Fixed (Hard) ,automation, programmable automations and Flexible automations (Soft).Comparison of types of automations .

5.4 Strategies in Automation - Simplification, specializations of operations, multiple operations, integration of work stations, increased flexibility, automated material handling storage system, on line inspection, on line monitoring, processes control and optimization, control of plant operations and computer integrated manufacturing.

UNIT VI

Chapter 6 : Robotics **6-1 to 6-44**

Syllabus :

6.1 Introduction to robotics - definition of robot and robotics, advantages disadvantages.

6.2 Basic components of robot - manipulator, end effectors, actuators, sensors, controller, processor and software.

6.3 Robot joints - linear, orthogonal, rotational, twisting and revolving.

6.4 Degree of freedom of robot - vertical, radial, rotational traverse, wrist pitch, wrist yaw, wrist roll.

6.5 Actuators - mechanical, hydraulic, pneumatic and electric.

6.6 End effectors - grippers and types.

6.7 Robot sensors - classification of sensors.

6.8 Basic configuration of robot - Cartesian, cylindrical, polar(spherical)

6.9 Applications of robot - loading, unloading, material handling, processing operations, assembly and inspection.

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