

## **UNIT – II PRODUCTION PLANNING AND CONTROL AND COMPUTERISED PROCESS PLANNING**

### **PROCESS PLANNING**

Process planning is a crucial step in manufacturing and production that involves determining the most efficient and effective way to transform raw materials into a finished product. It includes selecting processes, tools, machines, and sequences required to produce a part or product while ensuring quality, cost-effectiveness, and efficiency.

#### **Types of Process Planning**

1. **Manual Process Planning** – Relies on the expertise and experience of engineers to develop the process.
2. **Computer-Aided Process Planning (CAPP)** – Uses software to automate and optimize process planning.

#### **Steps in Process Planning**

1. **Analyzing the Design** – Understanding product specifications and requirements.
2. **Selecting Manufacturing Processes** – Choosing machining, casting, welding, or other methods.
3. **Choosing Equipment and Tools** – Determining the machines, fixtures, and tools required.
4. **Determining Process Sequence** – Organizing operations in an optimal order.
5. **Setting Process Parameters** – Deciding on cutting speed, feed rate, temperature, etc.
6. **Estimating Time and Cost** – Calculating production time and cost.
7. **Documentation** – Creating route sheets and process sheets.

#### **Importance of Process Planning**

- Reduces production time and cost.
- Improves product quality and consistency.
- Optimizes resource utilization.
- Enhances productivity and efficiency.

## Planning Process



## COMPUTER AIDED PROCESS PLANNING

### Computer-Aided Process Planning (CAPP)

**Computer-Aided Process Planning (CAPP)** is the use of computer systems to assist in the development of manufacturing process plans. It helps in automating and optimizing the selection of manufacturing processes, tools, machines, and sequences, reducing human intervention and improving efficiency.

### Types of CAPP

#### 1. Variant CAPP (Group Technology-based)

- Uses predefined process plans for similar parts.
- Relies on Group Technology (GT) to classify parts into families.
- Reduces planning time but lacks flexibility.

#### 2. Generative CAPP

- Uses AI and rule-based systems to generate new process plans.
- Analyzes part design and suggests optimal processes.
- More flexible but complex to implement.

### Steps in CAPP

1. **Input Part Design Information** – CAD models or drawings are fed into the system.
2. **Material and Process Selection** – System selects the best materials and manufacturing methods.
3. **Machine and Tool Selection** – CAPP determines suitable machines, tools, and fixtures.
4. **Process Sequence Generation** – Optimal order of operations is planned.

5. **Time and Cost Estimation** – Production time and costs are calculated.
6. **Process Documentation** – Route sheets, process plans, and work instructions are generated.

### Benefits of CAPP

- Reduces process planning time.
- Ensures consistency and standardization.
- Improves productivity and cost efficiency.
- Enhances flexibility in manufacturing.
- Integrates with CAD, CAM, and ERP systems.

