

# **PRODUCT REALIZATION THROUGH MANUFACTURING SYLLABUS**

**COURSE TITLE:** Product realization through manufacturing

**Semester:** I & II

**Course Type:** Practical / Hands-on

**L-T-P-S:** 0-0-2-1

**Credits:** 2

**Contact Hours:** 3 Hours per Week

## **COURSE OBJECTIVES**

The course aims to:

- Introduce students to basic manufacturing and fabrication processes.
- Develop practical skills in machining, welding, and carpentry operations.
- Familiarize students with workshop tools, machines, safety practices, and materials.
- Build confidence in interpreting drawings and fabricating simple components.
- Promote safe working habits and teamwork in workshop environments.

## **MODULE I – MACHINE TOOL SECTION**

### **Objectives**

- To understand basic machine tools and machining operations.
- To develop skills in different operations on a lathe machine .

### **Contents**

#### **1. Introduction to Machine Shop**

- Workshop safety practices
- Personal protective equipment (PPE)
- Introduction to engineering materials
- Measuring instruments:
  - Steel rule
  - Vernier caliper
  - Micrometer

#### **2. Centre Lathe Operations**

- Construction and parts of lathe
- Lathe accessories and cutting tools
- Operations:
  - Facing
  - Plain turning
  - Step turning
  - Taper turning
  - Knurling
  - Thread cutting
  - Parting off
  - Chamfering

- Drilling
- Boring

### **Practical Exercises**

- Plain rough turning of a cylindrical MS billet
- Specific metal removal through plain turning of a cylindrical MS billet
- Step turning of a cylindrical MS billet
- Taper turning of a cylindrical MS billet

## **MODULE II – WELDING SECTION**

### **Objectives**

- To understand welding principles and safety.
- To perform basic welding operations and joint preparation.

### **Contents**

#### **1. Introduction to Welding**

- Welding processes and applications
- Welding safety and precautions
- Types of welding joints:
  - Butt joint
  - Lap joint
  - T-joint
  - Corner joint

#### **2. Types of Welding**

- Arc welding
- Oxy-acetylene welding
- MIG welding
- TIG welding
- Spot welding

#### **3. Arc Welding**

- Arc welding equipment and accessories
- Electrodes and polarity
- Arc striking and arc length control
- Welding defects and remedies

### **Practical Exercises**

- Bead formation on mild steel plate
- Butt joint fabrication
- Lap joint fabrication
- T-joint fabrication
- Simple fabricated job preparation

## **MODULE III – CARPENTRY SECTION**

### **Objectives**

- To introduce students to wood working tools and operations.
- To develop skills in marking, cutting, fitting, and joining wooden components.

### **Contents**

#### **1. Introduction to Carpentry**

- Types of wood and their properties
- Seasoning and preservation of timber
- Workshop safety in carpentry shop

#### **2. Carpentry Tools**

- Measuring and marking tools
- Cutting tools:
  - Hand saw
  - Chisels
- Planing and finishing tools
- Wood working machines (demonstration)

#### **3. Carpentry Operations**

- Marking and measuring
- Sawing
- Planning
- Chiseling
- Drilling and fastening

#### **4. Wood Joints**

- Cross-halving joint
- Mortise and tenon joint
- Dovetail joint (demonstration)
- Corner joint

### **Practical Exercises**

- Preparation of T- joint
- Preparation of Dove tail joint
- Preparation of Cross joint
- Preparation of Mortise and tenon joint
- Preparation of a Lengthening joint

### **TEACHING METHODOLOGY**

- Demonstration-based instruction
- Hands-on practical sessions

- Group workshop assignments
- Safety drills and machine handling practice

### **LEARNING OUTCOMES**

After successful completion of the course, students will be able to:

1. Identify and safely operate basic workshop machines and tools.
2. Perform elementary machining, welding, and carpentry operations.
3. Interpret simple engineering drawings for fabrication.
4. Fabricate simple components using appropriate processes.
5. Follow standard workshop safety procedures.

### **SUGGESTED REFERENCE BOOKS**

1. **Workshop Technology Vol. I** — by S.K. Hajra Choudhury, A.K. Hajra Choudhury and Nirjhar Roy
2. **Manufacturing Technology** — by P.N. Rao
3. **A Course in Workshop Technology** — by B.S. Raghuwanshi
4. **Elements of Workshop Technology** — by S.K. Sharma