



**SILVER OAK UNIVERSITY**  
**College of Technology (01)**  
**Bachelor of Technology in Mechanical Engineering**  
**Subject Name: Workshop Technology-II**  
**Subject Code:1010123220**  
**Semester: 4<sup>th</sup>**

**Prerequisite:** Workshop Technology-I

**Objective:** The Workshop Technology-II course is prepared to gain the theoretical as well as the practical knowledge about the various manufacturing processes such as the metal casting, metal shaping, metal joining, plastic moulding and powder Metallurgy. It also assists students to select the appropriate manufacturing process for the given particular application and this will enable them to seek employment in engineering upon graduation.

**Teaching and Examination Scheme:**

Teaching Scheme					Evaluation Scheme				Total Marks
L	T	P	Contact hours	Credits	Theoretical		Practical		
					CIE (TH)	ESE (TH)	CIE (PR)	ESE (PR)	
3	0	2	5	4	40	60	20	30	150

**Content:**

Unit No.	Contents	Teaching Hours	Weightage %
1	<b>Manufacturing Technology:</b> Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of Manufacturing processes.	03	6%
2	<b>Metal Casting Processes:</b> <b>Patterns Practices:</b> Types of patterns, allowances and material used for patterns, moulding materials, moulding sands; properties of Sand, Moulding Sand Testing Methods, core materials and core making, core print; core boxes, chaplets, Moulding practices: Green, dry and loam sand moulding process. <b>Casting Practices:</b> Casting principle, Metal casting processes and equipment, Gating system & Riser Design, Casting Furnaces, Melting of metal in foundry, Heat transfer and solidification, Casting defects and residual stresses.	11	25%

3	<p><b>Metal Joining Processes:</b> Principle of welding, soldering, Brazing and adhesive bonding. Classification of welding Processes. Gas welding and gas cutting, Principle, Oxyacetylene welding, equipment, Oxy hydrogen welding. Flame cutting. Arc welding, Power sources and consumables, Gas welding and cutting, Processes and Equipment. Resistance welding, Principle and Equipment, Spot, Projection and seam welding process, Atomic hydrogen, ultrasonic, Plasma and laser beam welding, Electron beam welding, and special welding processes e.g. TIG, MIG, friction and explosive welding, welding of C.I. and Al, Welding defects. Electrodes and Electrode Coatings, Welding positions.</p>	10	22%
4	<p><b>Metal Forming Processes:</b> Metal working, Elastic and plastic deformation, Concept of strain hardening, Hot and cold Working, Rolling: Principle and operations, Extrusion, Wire and tube drawing processes.</p> <p><b>Forging:</b> Method of forging, Forging hammers and presses, Principle of forging tool design, Cold working processes: Shearing, Drawing, Squeezing, Blanking, Piercing, deep drawing, Coining and embossing, Metal working defects, cold heading, Riveting, Thread rolling bending and forming operation.</p>	10	23%
5	<p><b>Plastic Technology:</b> Introduction, Classification of Plastics, General Properties of Plastics, Plastic-part manufacturing processes such as compression moulding, Transfer moulding, Injection moulding, Extrusion moulding, blow moulding, Calendaring, Thermo forming, slush moulding.</p>	8	17%
6	<p><b>Powder Metallurgy:</b> Applications of powder metallurgy, advantages of powder metallurgy, manufacturing processes, production of powder, compacting, sintering, products of powder metallurgy.</p>	3	7%

**Course Outcome:**

Sr. No.	CO statement	Unit No
CO-1	To understand the basics of manufacturing processes.	1
CO-2	To intimate the casting and welding processes for functional requirement.	2,3
CO-3	Select the appropriate metal forming processes for a given application.	4
CO-4	To Discriminate the distinctive plastic moulding processes and its application.	5
CO-5	To comprehend the Scope of the Powder Metallurgy in the field of Manufacturing.	6

## **Teaching & Learning Methodology:**

1. Direct instruction
2. Kinesthetic learning
3. Flipped classroom
4. Personalized learning
5. Open Ended Problem

## **List of Experiments:**

1. Basic understanding of Different Manufacturing Processes: concepts, application, advantage and future aspects.
2. Job making of Casting Process.
3. Job making of Welding Process.
4. Job making of Sheet Metal Working Process.
5. Demonstration on Plastic Processing (Industrial Visit)
6. To study the introduction to Powder Metallurgy, application, advantage and its future aspects.

## **Major Equipment:**

1. Different patterns for Demonstration
2. Small foundry shop
3. Welding Machine: Arc welding machine, Gas welding machine, TIG, Spot welding.
4. Mechanical Press
5. Machine for Plastic processing (if possible, otherwise may arrange for industrial visit)

## **Books Recommended:**

1. Production technology, by R.K. Jain, Khanna publishers.
2. Production Technology by P.C. Sharma S Chand & Co Ltd.
3. Manufacturing Technology Vol-II, By P.N. Rao, Tata McGraw Hill.
4. Manufacturing Engg. And Technology By S. Kalpakajain, PHI/Pearson.
5. Welding technology, by O.P.Khanna, DhanpatRai publishers.
6. Materials Science and Metallurgy, K. I. Parashivamurthy, Pearson Education.

## **List of Open Source Software/learning website:**

NPTEL notes and videos

1. <https://nptel.ac.in/courses/112/107/112107083/>
2. <https://nptel.ac.in/courses/112/107/112107084/>
3. <https://nptel.ac.in/courses/112/103/112103263/>
4. <https://nptel.ac.in/courses/112/107/112107089/>
5. <https://nptel.ac.in/courses/112/106/112106153/>
6. <https://nptel.ac.in/courses/113/106/113106098/>