



Course Syllabus  
Gyanmanjari Diploma Engineering College  
Semester-3

**Subject :** Manufacturing Engineering-1 - DETME13204

**Type of course:** Minor

**Prerequisite:** Workshop

**Rationale:** Students enrolled in Manufacturing Engineering-1 will gain knowledge and skills necessary to make a variety of goods through the use of plastic moulding, metal casting, metal joining, and metal forming techniques. A manufacturing engineer is a vital member of the engineering community and needs to be knowledgeable about and skilled in manufacturing processes. As a result, the focus of this Manufacturing Engineering I course is on developing skills through the addition of practices in every subject. In each engineering industry, the most crucial component is the manufacturing process. Building a robust local manufacturing sector is essential if we are to realise the "Make in India" national goal.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
			ESE	MSE	V	P	ALA		
4	-	2	5	60	30	10	20	30	150

*Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*



**Course Content:**

Sr. No	Course content	Hrs	% Weightage
1	<p><b>Introduction to manufacturing processes</b></p> <ul style="list-style-type: none"> <li>● Explain the basic manufacturing processes.</li> <li>● Describe various mechanical properties involved.</li> <li>● Nature, role and scope of manufacturing processes.</li> <li>● Role of machining, forming, casting and joining processes in manufacturing of industrial components.</li> <li>● Recall mechanical properties of material.</li> </ul>	6	5%
2	<p><b>Metal working processes</b></p> <ul style="list-style-type: none"> <li>● Compare the principles of hot and cold working Process.</li> <li>● Identify and explain various metal working processes.</li> <li>● Suggest appropriate metal working process and basic parameters for a given industrial component</li> <li>● Concept, principles and differences of hot and cold working processes.</li> <li>● Classification of forming processes.</li> <li>● Definition, working principle and application of Rolling, Forging, Spinning, Drawing, Extrusion, Swaging.</li> </ul>	13	15%
3	<p><b>Metal casting processes</b></p> <ul style="list-style-type: none"> <li>● Introduction of casting.</li> <li>● Steps in casting.</li> <li>● Advantage and disadvantage on metal casting.</li> <li>● Difference between pattern and casting.</li> <li>● What is Pattern, its function and its types?</li> <li>● Pattern allowances</li> <li>● Moulding material.</li> <li>● Mould sintering</li> <li>● Sand moulding and its types.</li> <li>● Metal moulding.</li> <li>● Investment moulding.</li> <li>● Shell moulding.</li> <li>● What is core and its need, type, making material, properties and its application.</li> <li>● Types, working and applications of furnaces.</li> <li>● Moulding equipment, their major specifications and applications.</li> <li>● Salvage techniques.</li> <li>● Recovery of sand.</li> <li>● Casting defects -types, causes, effects and remedies.</li> <li>● Safety precautions in foundry</li> </ul>	20	35%



4	<p><b>Non metal moulding processes</b></p> <ul style="list-style-type: none"> <li>● Concept, basic principle, major parts, working and their materials of construction, process parameters and applications of:             <ol style="list-style-type: none"> <li>i. Injection moulding.</li> <li>ii. Blow moulding.</li> <li>iii. Extrusion process.</li> </ol> </li> <li>● Safety precautions</li> </ul>	4	15%
5	<p><b>Metal joining processes</b></p> <ul style="list-style-type: none"> <li>● What is the metal joining process?</li> <li>● Explain Welding process and its different types.</li> <li>● Different types of welding joints.</li> <li>● Practise standard safety norms during any joining process.</li> <li>● Welding: working principle, setup sketch, specifications of equipment and consumables, functions of each element, process parameters for various materials, applications and safety precautions for:             <ul style="list-style-type: none"> <li>● Gas welding [Oxy-acetylene, Air Acetylene, oxy-hydrogen and LPG (Liquid Petroleum Gas)- oxygen].</li> <li>● Arc welding [Carbon arc, metal arc, MIG (Metal Inert Gas), TIG (Tungsten Inert Gas), flux coated arc and submerged arc].</li> <li>● Resistance welding (butt, spot, seam, projection and percussion).</li> <li>● Thermit welding.</li> <li>● Forged welding</li> <li>● Welding defects -types, causes, effects and remedies.</li> </ul> </li> </ul>	17	30%

**Continuous Assessment (ALA):**

Sr. No	Active Learning Activities	Marks
1	<p><b>Various method of manufacturing</b> Choose four industrial components (teacher approved) and enumerate the different manufacturing processes that went into making them and upload report on GMIU web portal</p>	10
2	<p><b>Identify casting method</b> Choose a minimum of two components that are cast exclusively. Add the kind of casting technique that was employed and upload report on GMIU web portal</p>	10



3	<b>Different moulding technique</b> Make a list of all the plastic products that are made with various moulding techniques. Name the procedure that was employed as well And upload presentation on GMIU web portal	10
Total		30

### Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	30%	20%	-	-	20%

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Course Outcome:

After learning the course the students should be able to:	
CO1	Understand the basics manufacturing processes.
CO2	Identify the various metal working processes under different conditions.
CO3	Identify Casting process and different types of foundries.
CO4	learn Concepts and basic knowledge about non metal joining processes.
CO5	Recognize Joining of metals with different welding processes.



**List of Practical**

Sr. No	Descriptions	Unit No	Hrs
1	Visit a nearby hot smithy process shop and make a report on its whole process.	2	02
2	Visit a nearby non metal moulding factory and make a report that includes information on raw material to finish products and the process used in forming that particular parts or items.a	4	02
3	Visit a local foundry and write a two-page report that includes information on the types, materials, processes, quantities, various sections, equipment used in accordance with specifications, process parameters being used, and consumables.	3	02
4	Prepare an arc welding tasks, each with a minimum of three pieces. This entails cutting raw materials, getting ready pre-weld pieces, using tacks, and welding continuously during each task.	5	04
5	Perform a gas welding task with minimum three parts of job should be taken and should include continuous welding.	5	04
6	Use spot/seam resistance welding to prepare a task. Cutting raw materials and preparing pre-weld pieces are also included in this.	5	04
7	Visit a neighbouring fabrication facility and write a two-page report outlining the different sections, equipment used, quantities produced, consumables, and equipment specifications.	5	04
8	Perform MIG welding tasks with two pieces and form a T shape with continuous welding.	5	04
9	Perform TIG welding on a shallow pipe which is cut into two pieces and then join them with continuous welding.	5	04
		Total	30



**Instructional Method:**

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

**Reference Books:**

- [1] Manufacturing Processes by H.N. Gupta.
- [2] Manufacturing Processes by U.K. Singh & Manish Dwivedi.
- [3] Introduction to basic manufacturing processes and workshop technology by Rajender Singh
- [4] Manufacturing Processes by M.S. Mahajan & M.V. Rawlani

