



Semester –III

Subject Name: Manufacturing Process-1

Subject Code: 09ME0305

Objective: This subject of manufacturing processes provides knowledge regarding different types of manufacturing processes used to produce variety of metal products used in automobile and other machines and equipment. It also develops understanding that can be used to suggest and manipulate vital process parameters related to different manufacturing processes so that the high quality component may be produced at low cost and in minimum time, this is important if we want to compete in today’s global market. It also provides information about behaviour of metal and change in it during different manufacturing process.

As a technician the knowledge and practical skills in different manufacturing processes are essential and hence emphasis is also given in this course towards skills development. Further the technician should be able to handle machine, equipment, tools and accessories in the recommended manner and also follow safety precautions.

Credits Earned: 6 Credits

Course Outcomes: After completion of this course, student will be able to

- To understand the fundamentals of manufacturing processes.
- Explain the basic manufacturing processes, describe various mechanical properties involved.
- Demonstrate knowledge of metal working processes.
- Employ knowledge of joining metals permanently or temporarily with application of heat.
- Suggest appropriate casting method suitable for a given industrial component, identify casting defects, their causes and suggest remedies
- Understand various types of welding process which is used for different applications.

Pre-requisite of course: N/A

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	6	6	00	30	20	50	50	100



Contents:

sr.no.	Topics	Teaching hrs.	Weightage
1	Introduction to manufacturing processes and properties of metal : Nature, role and scope of manufacturing processes, Classification of manufacturing process, properties of metal, condition affecting manufacturing process, Recall mechanical properties of material.	04	-
2	Metal working processes: detail explanation of hot working process, cold working process, different between hot & cold working process, classification, definition & explanation of Rolling, Forging, Spinning, Drawing, Extrusion, and Swaging processes. Cost terminology associated with forging shop. The procedure of calculating material cost of a product for forging shop (including input weight, cut weight, forged weight etc.). Procedure of estimating cost of forging dies. Procedure of estimating forging cost. Given the forged component, estimate forging cost.	08	-
3	Metal casting process-: explanation of different types of foundries, detail explanation of pattern (importance, types, drawing and color code, material, making process, allowance and their values and application), detail explanation of cores (Types, Need, Making materials and its properties, testing methods, sintering, applications), Types, working and applications of furnaces, Moulding sand, moulding equipment's, major specifications, type of mould, mould making, Salvage techniques, recovery of sand, casting processes: basic principle, working, process parameters and applications, casting defects, safety precautions in foundry, non-metal casting : injection moulding, blow moulding. Cost terminology associated with foundry shop, The procedure of calculating material cost of a product for foundry shop, Procedure of estimating cost of pattern making, Procedure of estimating foundry cost, Given the casting component, estimate foundry cost.	34	-
4	Welding process: introduction and classification, explanation, working, construction, application of Gas welding, Arc welding, Resistance welding, Elements of cost in arc welding. Factors effecting arc welding cost. Estimating cost elements for: Consumables in arc welding and gas cutting, Gas cutting, and Arc welding. Estimation of production cost of given welding job for above methods.	26	-
5	Soldering Process: working principle, setup sketch, specifications of equipment, tools and consumables, function of each element, process parameters for various materials	06	-
6	Brazing Process: working principle, setup sketch, specification of equipment, various materials practical application	06	-



References:

1. Manufacturing engineering by J. A. Vadher, Atul prakashan. (English version)
2. Manufacturing engineering by J. A. Vadher, Atul prakashan. (Gujarati version)
3. Workshop Technology I, II & III by W. A. J. Chapman, Arnold Publication.
4. Workshop Technology I & II by J. A. Schey, Tata MacGraw Hill Education.
5. Workshop Technology (vol-1) by S. K. Hajra Choudhury, MPP.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
30%	40%	30%	----	----	----

Suggested List of Experiments:

1. Study and Selection of a component for pattern making.
2. Prepare a pattern drawing, pattern and core from the given component/drawing.
3. Prepare a mould using prepared pattern, core and moulding sand. Also pour molten metal and get the casting.
4. Analyse the various defects causes and remedies of cast components.
5. Visit Forging industries nearby you and understand the entire process of forging.
6. To understand and perform various types of welding joints by using MIG and TIG welding process.
7. Understand and demonstrate Oxy-Acetylene Welding Process.
8. Study Resistance Welding and Perform Spot welding process for give Component.
9. Virtual Lab Experiment for E-Foundry and Metal Forming.

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.



- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory