

Subject Code: 1ET1010405	Subject Title: Manufacturing Processes-II
Pre-requisite Subject	Workshop

Course Objective:

This course will help student to

1. Learn fundamental knowledge of manufacturing Processes.
2. Emphasize the importance of manufacturing Processes in industries.
3. Understand the advancement of Technology in manufacturing.
4. Interact with industrial materials and processes.
5. Initiate process equipment design and parameters.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total (T+P)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	70	30	30	20	150

Subject Contents				
Sr. No.	Topic	Total Hours	Weight (%)	
01	Introduction: Importance of Manufacturing, Classification and Factors affecting for selection of manufacturing processes, Engineering materials and its properties.	02	5	
02	Metal Casting Processes: Introduction, Advantages, applications, Steps involved in making a casting, Types of patterns, allowances and Pattern materials, molding materials, Molding sand and its properties, sand testing: Grain fineness, moisture content, clay content and Permeability test. Core materials and core making. Molding practices: Green, dry and loam sand molding, pit and floor molding, shell Molding, permanent molding, carbon dioxide molding. Melting furnaces: Rotary, Pit electric, Tilting and cupola. Casting design considerations, capabilities and applications of casting processes, Gating and Riser design, casting defects and its Remedies.	13	30	
03	Metal Forming Processes : Introduction, Classification, Hot Working and Cold Working. Rolling: Introduction, classification, Principles of Metal Rolling, roll passes, Analysis of Rolling Force. Defects in rolled products and remedies. Forging: Introduction, classification, Various Forging Operations, Forging Die Materials and Lubrication, Forge ability, Forging Defects and remedies. Extrusion: Introduction, classification, Various Extrusion Operations, Metal Deformation and Forces in Extrusion. Materials and Lubrication considerations in Extrusion Process, Extrusion Defects, Extrusion of Tubing, Production of	08	20	

	Seamless Pipe and Tubing. Drawing Operations: Drawing of Rods, Wires and Tubes, Spinning.		
04	Metal Joining Processes: Classification, application, advantages, and disadvantages, welding terminology. Gas Welding: Oxy acetylene gas welding principles, Types of flames, Welding techniques, Edge preparation, Equipment, filler rods. Electric Arc Welding: Principles of electric arc welding, A.C. / D.C. welding characteristics, Edge preparation, AC/DC welding machines, Welding electrodes, types and function of flux coating, Carbon arc welding, shielded metal arc welding, gas metal arc welding (GMAW/MIG welding), gas tungsten arc welding (GTAW/TIG welding), Submerged arc welding, Plasma arc welding electro slag and electro gas welding, Stud arc welding, Resistance Welding: Principles, types: spot welding, seam welding, projection welding, upset butt welding, flash butt welding. Other Welding Methods: friction welding, ultrasonic welding, forge welding, atomic hydrogen welding, electron beam welding, laser beam welding, welding defects and remedies. Soldering and Brazing: Types, Principles and applications.	13	30
05	Sheet Metal Processes: Types of press, Types of dies: compound dies, progressive dies, and combination dies. Importance of sheet metal working, materials, desirable properties of materials in sheet metal products, Basic applications: blanking, piercing and punching, Drawing processes: shallow and deep drawing, bending.	06	15

Course Outcome:

The student will be able to

1. Select materials, types and allowances of patterns used in casting and
2. Analyze the components of moulds, core, core print and gating system in metal casting processes.
3. Select among different welding process.
4. Develop process-maps for metal forming processes.
5. Identify the effect of process variables to manufacture defect free products.
6. Estimate formability limits for sheets and bulk metals.

List of References:

1. P. N. Rao, "Manufacturing Technology", Tata McGraw Hill
2. R. K. Jain, "Production Technology", Khanna Publishers, New Delhi, 2001.
3. O. P. Khanna, "Welding Technology", by Dhanpat Rai publishers.
4. A. Ghosh & A.K. Mallik, "Manufacturing Science", East West Press Pvt. Ltd., New Delhi
5. P.C. Sharma, "A text book of production technology", S. Chand and Company, IV Edition, 2003
6. R. L. Little, "Welding technology", Tata McGraw Hill, 2005
7. J. A. Schey, "Introduction to Manufacturing Processes", McGraw Hill, 2002

List of Practical:

1. Understanding of different Manufacturing Processes: concepts, application, advantage and future aspects.
2. Demonstration on sweep pattern and core making in mould preparation
3. Demonstration on pouring practice for permanent mould.
4. Prepare a Job on metal casting of different pattern.
5. Study about metal working Processes.
6. Prepare a job using forging Process.
7. Demonstration of gas welding process.
8. Prepare a job using arc welding.
9. Prepare a butt joint in the given work piece by using metal inert gas welding.
10. Prepare a job using resistance welding.
11. Demonstration of power press and its operations.