

MANUFACTURING PROCESSES

III Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AMEB05	Core	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
I. COURSE OVERVIEW:								
<p>The primary objective of this course is to introduce the concept of manufacturing technology with the help of various processes widely employed in industries. The course consists of casting, welding, sheet metal forming, extrusion and forging processes with the related details of equipment and applications. Introduces the different manufacturing processes and breakeven analysis. Engineering materials, laying emphasis on ferrous and non-ferrous materials along with the heat treatment of metals. Discusses the special casting processes and metal-forming processes respectively.</p>								
II. OBJECTIVES:								
The course should enable the students to:								
<ol style="list-style-type: none"> I. Understand and develop an appreciation of the manufacturing processes in correlation with material properties. II. Learn the material properties which change the shape, size and form of the raw materials into the desirable product. III. Understand the processes for creating products by conventional or unconventional manufacturing methods. 								
III. COURSE OUTCOMES (COs):								
COs Course Outcome								
CO 1 Describe the concept of manufacturing and material, design and properties of casting.								
CO 2 Understand the functions of casting defects, welding and industrial concepts.								
CO 3 Understand the working of design related and causes and NDT techniques systems.								
CO 4 Explore the concept of heat inputs and rapid prototyping, sheet metal and forging								
CO 5 Classification of various manufacturing processes for industrial applications and their use in real world competition								
IV. SYLLABUS:								
MODULE-I	CASTING						Classes: 09	
Casting: Steps involved in making a casting, its applications, patterns and types of patterns, pattern allowances and their construction, types of casting processes, solidification of casting.								

MODULE-II	WELDING	Classes: 09
<p>Welding: Welding types, Oxy-fuel gas welding, cutting, standard time and cost calculations, arc welding Process, forge welding, resistance welding, thermit welding. Inert gas welding, TIG welding, MIG welding, friction welding, induction pressure welding, explosive welding, electron beam welding, laser welding, soldering and brazing. Heat affected zone in welding, welding defects, causes and remedies, destructive and non-destructive testing of welds.</p>		
MODULE-III	METAL FORMING	Classes: 09
<p>Forming: Hot working, cold working, strain hardening, recovery, re-crystallization and grain growth, comparison of properties of cold and hot worked parts, rolling fundamentals, theory of rolling, types of rolling mills and products; Forces in rolling and power requirements, stamping, forming and other cold. Working processes: Blanking and piercing, bending and forming, drawing and its types, wire drawing and tube drawing; coining; hot and cold spinning, types of presses and press tools, forces and power requirements for the above operations.</p>		
MODULE-IV	EXTRUSION AND RAPID PROTOTYPING	Classes: 09
<p>Extrusion of Metals: Basic extrusion process and its characteristics, hot extrusion and cold extrusion, forward extrusion and backward extrusion, impact extrusion, extruding equipment, tube extrusion and Pipe making, hydrostatic extrusion, forces in extrusion; Additive manufacturing: Rapid prototyping and rapid tooling.</p>		
MODULE-V	FORGING	Classes: 09
<p>Forging processes: Forging operations and principles, tools, forging methods, Smith forging, drop forging, roll forging, forging hammers: Rotary forging, forging defects, cold forging, swaging, forces in forging operations.</p>		
V. Text Books:		
1.Kalpakjian and Schmid, Manufacturing processes for engineering materials -Pearson India, 5 th Edition 2014.		
VI. Reference Books:		
1. Mikell P. Groover, Fundamentals of Modern Manufacturing: Materials, Processes, and Systems John Wiley & Sons Inc., 4 th Edition, 2008. 2. Degarmo, Black &Kohser, Materials and Processes in Manufacturing (9th Edition) John Wiley & Sons Inc., 7 th Edition, 2012.		
VII. Web References:		
1. https://books.google.co.in/books/about/Manufacturing_Processes_Reference_Guide.html?id=6x1smAf_PAcC		
VIII. E-Text Books:		
1. https://books.google.co.in/books?id=6wFuw6wufTMC&printsec=frontcover#v=onepage&q&f=false		