

Branch Name:	Mechanical Engineering
Program Code:	ET402
Course Title:	Basic Manufacturing Engineering
Course Code:	2ET4020301
Pre-requisite Course:	-----

Course Objectives:

1. To produce different job of casting, forming, joining using process parameters and safe working procedures.
2. Provide knowledge of different types of manufacturing processes.
3. It also develops understanding to different manufacturing processes so that the high quality
4. Component may be produced at low cost and in minimum time, this is important if we want to Compete in today's global market.
5. It also provides information about behaviour of metal and change in it during different manufacturing Process.
6. Further the technician should be able to handle machine, equipment, tools and accessories in the Recommended manner and also follow safety precautions.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	4	5	60	40	40	60	200

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Introduction to Manufacturing Processes - Describe various mechanical properties - Explain the basic manufacturing processes.	04	10
2	Metal Forming Processes - Concept, principles and differences of hot and cold working processes. - Classification of forming processes. Rolling, Forging, Spinning, Drawing, Extrusion, Swaging. - Types, working principle, Equipment used and their specifications, Major parts of equipment and their construction of materials and functions, Process parameters, Applications	12	28
3	Metal Joining Processes - Introduction and classification. - Welding: working principle, specifications of equipment and consumables, functions of each element, process parameters for various materials, applications and safety precautions for: - Gas welding, Arc welding (Carbon arc, metal arc, MIG (Metal Inert Gas), TIG (Tungsten Inert Gas), flux coated arc and submerged arc). Resistance welding (butt, spot, seam, projection and percussion). Thermit welding. Forged welding. Soldering and Brazing.	10	24

4	Metal Casting Processes • The need of casting process. • Basic concept of foundry process. Types of foundries. • Pattern: Importance, Types and materials of construction, Allowances, their need and normal values, Drawings and color codes, Making process, Applications. • Cores: Need, Types, making materials and its properties, Testing methods, Sintering, Applications. • Types, working and applications of furnaces. • Molding sand: Sand properties, Sand mixing, Sand binders. • Molding equipment, their major specifications and applications • Types of mould, mould making, mould sintering and applications of mould. Casting processes: basic principle, working, process parameters and applications. Centrifugal, Die, Investment, Shell molding Casting defects –types, causes, effects and remedies. • Safety precautions in foundry.	12	28
5	Non-metal Moulding Processes • Concept, basic principle, major parts, working and their materials of construction, process parameters and applications of: i. Injection Moulding ii. Blow Moulding iii. Extrusion Process • Safety Precautions.	04	10

List of Practical/Experiments:

1. Visit a nearby Rolling mill/Hot-Cold material processes, allied manufacturing processes industry and prepare a two-page report comprises of details (type, material, process, etc.) of items produced, quantities, different sections, equipment used with specification, process parameters being used and consumables.
2. Demonstration of metal melting, metal pouring, metal casting and casting finishing.
3. Prepare a pattern drawing, pattern and core from the given component/drawing.
4. Prepare a mould using prepared pattern, core and moulding sand. Also pour molten metal and get the casting.
5. Prepare a job using metal arc welding.
6. Prepare a job using spot welding.
7. Prepare two jobs, one using soldering and another using brazing.
8. Prepare a job using hot forging/hot smithy process.

Text Books:

1. Manufacturing Engineering 1, M.K Vora and J.A Vadher, Atul Prakashan

Reference Books:

1. Production Technology, R.K. Jain and S.C. Gupta, Khanna publication
2. Workshop Technology I & II, Raghuwanshi, Dhanpat Rai and Sons
3. Foundry Engineering, P. L. Jain, Tata MacGraw Hill Education
4. Principle of Foundry, Jain & Gupta, National Book Trust, India

List of Open-Source Software/learning website:

1. http://thelibraryofmanufacturing.com/forming_basics.html
2. http://www3.nd.edu/~manufact/MPEM%20pdf_files/Ch07.pdf
3. www.ielm.ust.hk/dfaculty/ajay/courses/ieem215/lecs/3_forming.pdf
4. www.youtube.com/watch?v=HkjdMdp9KVU
5. <http://www-old.me.gatech.edu/jonathan.colton/me4210/casting.pdf>

6. http://www.youtube.com/watch?v=6xnKmt_gsLs(HotRolling)
7. http://www.youtube.com/watch?v=9MU0vSN_w-A(Coldrollforming)
8. <http://www.youtube.com/user/IGEJohannesen?feature=watch>(ChannelForweldingvideos)
9. <http://www.youtube.com/watch?v=SDJdiNeDXto>(IntroductiontoWelding)
10. <http://www.youtube.com/watch?v=CJ42scaWFnw> (Brazing video)

Course Learning Outcomes (CLO):

1. Introduction of manufacturing engineering.
2. Describe various mechanical properties.
3. Metal forming processes and its applications.
4. Metal joining processes and its applications.
5. Metal casting processes and its applications.
6. Defects in forging and casting process.

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H												M		M	
CLO2	M															
CLO3	M	L				L		M	H				M		M	
CLO4	M	L				L		M	H				M		M	
CLO5	M	L				L		M	H				M		M	
CLO6		M		M	L							M				

H: High, M: Medium, L: Low