



**C. U. SHAH UNIVERSITY**  
**Wadhwan City**

**FACULTY OF:** - Technology & Engineering  
**DEPARTMENT OF:** - Mechanical Engineering  
**SEMESTER:** - V  
**CODE:** -4TE05MPR1  
**NAME –** Manufacturing Processes-II

**Teaching & Evaluation Scheme:-**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE05MPR1	Manufacturing Processes-II	4	0	2	6	5	30	1.5	70	3	---	20	30	150

**Objectives:-**

1. To select appropriate manufacturing process for producing part under consideration.
2. To identify various process parameter and their effects on processes
3. To design the process and tooling.
4. To identify the defects and propose the remedies

**Prerequisites:** -Basic knowledge of tools used in workshop.

**Course outline:-**

Sr. No.	Course Contents	Hours
1	<b>Manufacturing Concept:</b> Importance of manufacturing, Classification of manufacturing processes, Primary and secondary manufacturing processes. Job, batch and mass production, Selection of Manufacturing process.	4
2	<b>Foundry Technology:</b> <b>Patterns Practices:</b> Types of patterns, allowances and material used for patterns, moulding materials. Moulding sands: properties and sand testing, core materials and core making, core print; core boxes, chaplets, gating system design. Moulding practices: Green, dry and loam sand moulding, pit and floor moulding; shell moulding; permanent moulding; carbon dioxide moulding. <b>Casting Practices:</b> Fundamental of metal casting, Sand casting, Shell-Mould casting, Mold casting (plaster and ceramic), Investment casting, Vacuum casting, Permanent mould casting, Slush casting, Die casting, Pressure die casting, Centrifugal casting, Continuous casting, Squeeze casting, Casting alloys, Casting defects, Design of casting, Gating system design, and riser design. Melting furnaces-rotary, Pit electric, Tilting and cupola. Metallurgical considerations, Solidification of Casting.	14
3	<b>Fabrication Processes:</b> Introduction, classification, general considerations, Welding, Types, Metallurgy of welding. Processes- Gas welding, Arc welding, Resistance welding, Solid state welding, Thermit welding. Newer welding Processes. Welding design & Welding defects, Testing & Inspection of Welds, Brazing & Soldering, Adhesive bonding , Mechanical fastening, Joining non metallic materials, Design consideration in joining, Economic consideration. Examples.	12



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4	<b>Metal Forming Processes:</b> Introduction, nature of plastic deformation. Hot working and Cold working processes, Rod ,Wire and tube drawing. Rolling, Rolling Load, Roll passes. sheet metal forming processes, metallurgical aspects. Smithing and forging: Introduction, process device, fibrous structure and grain flow of forging, Depth and heat treatment of forged parts; design considerations. Orbital forging, Rotary swaging, Examples.	10
5	<b>Processing Polymers and Reinforced Plastics:</b> Introduction , Types of plastics, Elastomers, Laminating & Reinforcing, processing of plastics, Extrusion, Injection molding, Blow molding, Insert molding. Thermoforming, Calendaring. Processing of reinforcing plastics, Molding, Filament winding, Pultrusion and Pulforming. Design considerations, Economics of processing plastic, General characteristics and applications.	10
6	<b>Nano Manufacturing:</b> Introduction, clean rooms, fabrication of Microelectronic, Microelectrochemical, Micromechanical devices, Micromachining of MEMS devices, LIGA and related Micro fabrication processes, Solid free-form fabrication, Mesoscale Manufacturing, Nanoscale Manufacturing.	10

**Learning Outcomes:-**

- Students will be able to select manufacturing process for the product under consideration and to tackle the common problem and faults.

**Text books:-**

1. Elements of Workshop Technology, **Hajra Choudhury** Vol. I and II”, Media Promoters Pvt Ltd., Mumbai.
2. Manufacturing Processes for Engineering Materials, **Serope Kalpakajain, Steven R. Schmid**, Pearson Publication.
3. Manufacturing Technology Volume - I & II, **P.N. Rao**, Tata McGraw Hill.

**Reference Books:-**

1. Production Technology, **P. C. Sharma**, S Chand & Co Ltd.
2. Production technology, **R. K. Jain**, Khanna publishers.
3. Elements of Manufacturing Processes, **B. S. Magendran Parashar & R. K. Mittal**, Prentice Hall of India.
4. Principles of Metal Casting, **Richard W. Heine, Carl R. Loper, Philip C. Rosenthal**, Tata McGraw Hill.
5. Welding Processes & Technology, **Dr. R. S. Parmar**, Khanna Publishers.
6. Welding technology, **O. P. Khanna**, Dhanpat Rai publishers.
7. Mechanical Metallurgy, By **George E. Dieter**, McGraw Hill Publications, NY.
8. Metal Forming by **Avitzur**, McGraw Hill Book Company

**Research Reference:-**

1. ASME – Journal of Manufacturing Science and Engineering
2. [www.springer.com](http://www.springer.com)
3. [www.sciencedirect.com](http://www.sciencedirect.com)