

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHATRONICS ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Manufacturing Technology-II**

Subject Code: **172003**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	2	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	METAL FORMING PROCESSES: Plasticity of metals; hot and cold working; frictionless work of deformation; metallurgical aspects: sheet metal forming work; Bending, Ironing, drawing, deep drawing, reverse redrawing.	6
2.	FOUNDRY PRACTICE: Patterns, types of patterns, advantages and limitation; pattern allowances; moulding sand; sand properties and testing; defects in casting; properties of liquid metal (density, fluidity, viscosity, specific heat etc) and its effect; casting design consideration; different types of gates, gating design; advantages and disadvantages of gating system; riser, riser design; location of riser; special casting methods-investment casting, centrifugal casting, die casting.	8
3.	WELDING PROCESSES: Basic requirements of welding process, classification of welding process; joining rate; static volt-ampere characteristics of welding arc; arc initiation and maintenance methods; welding process parameters and its effect(type of current, electrode polarity, current, voltage and welding speed); power source characteristics; arc welding processes; capability; variables; consumables; application.	7
4.	ADVANCED MEASURING AND GAUGING TECHNIQUES: Standards of measurements, sources of error, angularity, concentricity, roundness, squareness, parallelism, comparators, interferometry, coordinate measuring machine.	5
5.	NON-TRADITIONAL MANUFACTURING METHODS: EDM, AJM, ECM, USM and LBM process principles, equipment and process parameters.	7

6.	JIG AND FIXTURES: Location principle; location analysis; work piece control-geometric control, mechanical control and dimensional control; location hardware; clamping and tool guiding elements; general design consideration for jigs and fixtures.	6
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List of Experiments:

1. To find GFN, clay content & moisture content.
2. Effect of clay content on green compressive strength, permeability and hardness of moulding sand.
3. Effect of moisture content on green compressive strength, permeability and hardness of moulding sand
4. Analysis of measuring and gauging instruments
5. Analysis of 3-2-1 location principle
6. To study the effect of process variables of EDM on MRR and surface finish
7. Effect of varying arc welding process variables on resultant bead parameters using bead on plate test-shielded metal arc welding
8. Effect of varying arc welding process variables on resultant bead parameters using bead on plate test-submerged arc welding
9. Effect of varying arc welding process variables on resultant bead parameters using bead on plate test-gas tungsten arc welding
10. Study and performance of oxyacetylene gas cutting process and resistance spot welding process.
11. Pipe bending, metal spinning and press work.

Text Books:

1. Principles of Engineering Production
Lissaman and Martin
ELBS
2. Manufacturing Technology - Foundry, Forming & Welding
P N Rao
Tata Mc Graw Hill

Reference Books:

1. Welding Processes & Technology
Parmar R S
Khanna Publishers
2. Production Technology
Hindustan Machine Tools
3. Metrology for Engineers
Galyer J F W and Shotbolt C R
ELBS
4. Non-Traditional Machining
Marcel Dekker
Benedict G F
5. Principle of Metal Casting
Addison Wesley
Flinn R A