GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3152510
Semester – V
Subject Name: Manufacturing Technology-II

Type of course:NA

Prerequisite:

Rationale: The Manufacturing Technology subject is designed to acquire theoretical and practical knowledge in foundry, metal forming, metal joining, manufacturing processes and plastic processing. The manufacturing program provides relevant industrial experience within the academic environment to apply theoretical and practical concepts to improve manufacturing processes and mechanical or manufacturing components.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Manufacturing Technology:**Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of Manufacturing process.	04
2	**Foundry Technology:** **Patterns practices:**Types of patterns, allowances and material used for patterns, moulding materials, mouldingsands, Moulding sands; properties and sand testing; grain fineness; moisture content, claycontent and permeability test, core materials and core making, core print; core boxes, chaplets,gating system design. Moulding practices: Green, dry and loam sand moulding, pit and floormoulding; shell moulding; permanent moulding; carbon dioxide moulding. **Casting practices:**Fundamental of metal casting, Sand casting, Shell-Mould casting, Mold casting (plaster andceramic), Investment casting, Vacuum casting, Permanent mould casting, Slush casting,Pressure casting, Die casting, Centrifugal casting, Continuous casting, Squeeze casting, Castingalloys, Casting defects, Design of casting, Gating system design, and riser design. Meltingfurnaces-rotary, Pit electric, Tilting and cupola. Metallurgical considerations in casting elementsof gating system, and risers and their design.	14
3	**Metal Joining Processes:** Principle of welding, soldering, Brazing and adhesive bonding. Classification of welding andallied processes. Gas welding and gas cutting, Principle, Oxyacetylene welding equipment, Oxyhydrogenwelding. Flame cutting. Arc welding, Power sources and consumables, Gas weldingand cuttingProcesses, Resistance welding: Spot,Projection and	14

	seam welding process. Atomic hydrogen, ultrasonic, Plasma and laser beamwelding, Electron beam welding, and special welding processes e.g. TIG, MIG, friction andexplosive welding, welding of C.I. and Al, Welding defects. Electrodes and Electrode Coatings,Welding positions.	
4	**Forming and Shaping Processes:** Metal working, Elastic and plastic deformation, Concept of strain hardening, Hot and cold Working, Rolling: Principle and operations, Roll pass sequence, Extrusion, Wire and tube drawing processes.Forging: Method of forging, Forging hammers andpresses, Principle of forging tool design,Cold working processes: Shearing, Drawing,Squeezing, Blanking, Piercing, deep drawing, Coining and embossing, Metal working defects,cold heading, Riveting, Thread rolling bending and forming operation.	**14**
5	**Plastic Technology:** Introduction, Classification of Plastics, Ingredients of Moulding compounds, General Properties ofPlastics, Plastic part manufacturing processes such as compression moulding,Transfermoulding, Injection moulding, Extrusion moulding, Blow moulding, Calendaring, Thermoforming,slush moulding, laminating	**07**
6	**Advance Super finishing Technology:** Introduction, Lapping, Horning, Buffing, Barrel Tumbling, Burnishing, Powder coating, Polishing.	**07**
	Total Hours	**60**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**20**	**20**	**10**	**-**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Production technology, by R.K. Jain, Khanna publishers.
2. Production Technology by P.C. Sharma S Chand & Co Ltd.
3. Manufacturing Technology Vol-II, By P.N. Rao, Tata McGraw Hill.
4. Manufacturing Engg. And Technology By S. Kalpakajain, PHI/Pearson.
5. Welding technology, by O.P.Khanna, Dhanpat Rai publishers.

Course Outcomes: Students will be able to:

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Sr. No.	CO statement	Marks % weightage
CO-1	Illustrate foundry techniques forpattern making, mold making, Core making and Inspection of defects.	25%
CO-2	Demonstratevarious metal forming processes	25%
CO-3	Make use of appropriate Metal joining Processes to join similar or dissimilar metals.	25%
CO-4	Explaindifferent plastic moulding processes and their applications	13%
CO-5	Comparedifferent Super Finishing Technology	12%

Term Work:

The term work shall be based on the topics mentioned above.

List of Experiments:

Experiments based on syllabus contents including workshop job of:

1. Casting Processes
2. Welding Processes
3. Sheet metal working
4. Plastic processes

Major Equipment:

1. Mechanical Press
2. Small foundry shop
3. Welding Machine: Arc welding machine, Gas welding machine, TIG, Spot welding etc..

List of Open Source Software/learning website:

NPTEL notes and videos