



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3151912

Semester – V

Subject Name: Manufacturing Technology

Type of course:

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 C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	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	03
2	Foundry Technology: Patterns practices: Types of patterns, allowances and material used for patterns, moulding materials, moulding sands, Moulding sands; properties and sand testing; grain fineness; moisture content, clay content 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 floor moulding; shell moulding; permanent moulding; carbon dioxide moulding. Casting practices: Fundamental of metal casting, Sand casting, Shell-Mould casting, Mold casting (plaster and ceramic), Investment casting, Vacuum casting, Permanent mould casting, Slush casting, Pressure casting, 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 in casting elements of gating system, and risers and their design.	10
3	Metal Joining Processes: Principle of welding, soldering, Brazing and adhesive bonding. Classification of welding and allied processes. Gas welding and gas cutting, Principle, Oxyacetylene welding	10



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	equipment, Oxyhydrogenwelding. Flame cutting. Arc welding, Power sources and consumables, Gas weldingand cutting, Processes and Equipment. Resistance welding, Principle and Equipment, Spot,Projection and 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.	10
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	06
6	Advance Super finishing Technology: Introduction, Lapping, Horning, Buffing, Barrel Tumbling, Burnishing, Powder coating, Polishing.	06

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
10	30	30	10	10	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, DhanpatRai publishers.

Course Outcomes:Students will be able to



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Sr. No.	CO statement	Marks % weightage
CO-1	Interpret foundry practices like pattern making, mold making, Core making and Inspection of defects.	25%
CO-2	Differentiate various metal forming processes	25%
CO-3	Select appropriate metal joining Processes to join similar or dissimilar metals.	25%
CO-4	Classify different plastic moulding processes and application	13%
CO-5	Distinguish different 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:

Mechanical Press

Small foundry shop

Welding Machine: Arc welding machine, Gas welding machine, TIG, Spot welding etc..

List of Open Source Software/learning website:

NPTEL notes and videos