

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

MECHANICAL ENGINEERING/AUTOMOBILE ENGINEERING/INDUSTRIAL ENGINEERING

Subject Name: **Manufacturing Processes – II**

Subject Code: **151901**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
3	0	2	5	70	30	50

Sr. No.	Course content
1	Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of Manufacturing process
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.
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 equipment, Oxy-hydrogen welding. Flame cutting. Arc welding, Power sources and consumables, Gas welding and cutting, Processes and Equipments. Resistance welding, Principle and Equipments, Spot, Projection and seam welding process, Atomic hydrogen, ultrasonic, Plasma and laser beam welding, Electron beam welding, and special welding processes e.g. TIG, MIG, friction and explosive 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, Forging, Forging operations, extrusion, Wire and tube drawing processes. Forging: Method of forging, Forging hammers and presses, 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.
5	Plastic Technology: Introduction, Classification of Plastics, Ingredients of Moulding compounds, General Properties of Plastics, Plastic part manufacturing processes such as compression moulding, Transfer moulding, Injection moulding, Extrusion moulding, Blow moulding, Calendaring, Thermoforming, slush moulding, laminating
6	Super finishing processes: Introduction, Grinding, Lapping, Honing, Buffing, Barrel Tumbling, Burnishing, Powder coating, Polishing

Term Work:

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

Practical / Oral:

The candidate shall be examined on the basis of term-work.

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.