

**Type of course:** Engineering Science**Prerequisite:** Zeal to learn the subject

Rationale: The Manufacturing Processes subject is designed to acquire theoretical and practical knowledge in foundry, metal forming, metal joining and other manufacturing processes. 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
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

Sr. No	Topic	No. of Hours	Weightage %
01	Manufacturing Technology: Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of Manufacturing process.	4	10
02	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, 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 defects, Design of casting, Gating system design, and riser design. Melting furnaces-rotary, Pit electric, Tilting and cupola.	12	30
03	Metal Joining Processes: Principle of welding, soldering, Brazing and adhesive bonding. Classification of welding and allied processes. Arc welding, Power sources and consumables, Gas welding and cutting Processes, Resistance welding: 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.	10	25

**GUJARAT TECHNOLOGICAL UNIVERSITY****Syllabus for Bachelor of Vocation (B.Voc), 2nd Semester****Branch: Production Technology****Subject Name: Manufacturing Processes****Subject Code: 21120301****With effective
from academic
year 2021-22**

	Welding defects. Electrodes and Electrode Coatings, Welding positions.		
04	Forming 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 and presses	10	25
05	Sheet Metal Working: Shearing, Drawing, Squeezing, Blanking, Piercing, deep drawing, Coining and embossing, V and edge bending, Curling, Ironing, Roll Bending, Metal Spinning.	4	10

Distribution of marks weightage for cognitive level:

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

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

Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO 1	Understand the basic concept of Manufacturing	10
CO 2	Illustrate foundry techniques for pattern making, mold making, Core making and Inspection of defects.	30
CO 3	Demonstrate various welding processes	25
CO 4	Demonstrate various metal forming processes	25
CO 5	Demonstrate various sheet metal forming processes	10

List of Open Source Software/learning website:

<https://nptel.ac.in>,