

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Diploma in Mechanical Engineering

### Semester: 3

**Subject Code**

**Subject Name** MANUFACTURING ENGINEERING - I

Sr. No.	Course content
1	<b>INTRODUCTION TO MANUFACTURING PROCESSES :</b> 1.1 Nature, role and scope of manufacturing processes. 1.2 Basic principle of mechanical working and its Terminology. 1.3 Role of metal working, metal casting and metal joining processes.
2	<b>METAL WORKING PROCESSES :</b> 2.1 Hot and cold working processes. 2.2 Working principles, equipments used and their specifications, process parameters and applications of: - Rolling - Bending - Forging - Spinning - Drawing - Shot peening - Extrusion - Coining - Forming - Swaging - Embossing - Sand blasting
3	<b>METAL CASTING :</b> 3.1 Types of foundries 3.2 Pattern making-process and importance 3.3 Patterns-types, sketches, applications 3.4 Pattern allowances and their values, material, drawings and color codes. 3.5 Cores - Types - Core making materials and its properties. - Testing, sintering and applications 3.6 Furnaces-types, working and applications 3.7 Moulding sand, sand properties, sand mixing and sand binders 3.8 Moulding equipments, their major specifications, applications 3.9 Types of mould, mould making, mould sintering and applications of mould. 3.10 Salvage techniques 3.11 Recovery of sand 3.12 Type of castings- i.e centrifugal , die , investment , shell moulding , special castings, etc. 3.13 casting defects-types, causes, effects, remedies 3.14 Recent trends in casting including Magnetic and Vacuum. 3.15 Metal melting and pouring-process, temperatures, precautions. 3.16 Finishing of casting-need and methods 3.17 I.S. grade of casting and its uses. 3.18 Casting materials-types, standards in BIS, EN, ASME, JIS, compositions, applications 3.19 Safety precautions in foundry.

<b>4</b>	<p><b>METAL JOINING PROCESSES :</b></p> <p>4.1 Introduction and classification.</p> <p>4.2 Welding-working principle, setup sketch, specifications of equipment, functions of each element, process parameters for various materials, safety precautions for following:</p> <ul style="list-style-type: none"> <li>- Gas welding(Oxy-acetylene, Air-acetylene, oxy-hydrogen and LPG Oxygen)</li> <li>- Arc welding (Carbon arc, metal arc, MIG, TIG, flux coated arc and Submerged arc)</li> <li>- Resistance welding (Butt, spot, seam, projection and percussion)</li> <li>- Thermit welding.</li> <li>- Forged welding.</li> </ul> <p>4.3 Soldering-working principle, setup sketch, specifications of equipment-tools and consumables, functions of each element, process parameters for various materials and safety precautions.</p> <p>4.4 Brazing-working principle, setup sketch, specifications of equipment-tools and consumables, functions of each element, process parameters for various materials and safety precautions.</p> <p>4.5 Adhesive joining-process, applications</p> <p>4.6 Fastening process- process, applications</p> <p>4.7 Recent trends in metal joining</p> <ul style="list-style-type: none"> <li>- Electron beam welding</li> <li>- Laser beam welding</li> <li>- Ultrasonic welding</li> </ul> <p>4.8 Welding Techniques / methods of joining non-homogeneous metals</p>
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**Reference Books :**

Sr. No.	Name of Books	Authors
1.	Workshop Technology I & II	- J.A.Schey
2.	Workshop Technology I & II	- Raghuwanshi
3.	Workshop Technology I, II & III	- W.A.J. Chapman
4.	Manufacturing Processes	- M.L.Begman
5.	Production Technology	- R.K.Jain and S.C.Gupta
6.	Welding Engineering	- B.E.Rossi
7.	Audles Welding Guide	- F.D.Graham
8.	Foundry Engineering	- P.L.Jain
9.	Principle of Foundry	- Jain & Gupta
10.	Manufacturing Processes	- S.E.Rusinoft
11.	Production Technology	- H.H.Marshall