

**Course Name:** Mechanical Engineering    **Course Code:** ME/MH

**Semester:** Third

**Subject Title:** Manufacturing Technology.    **Subject Code:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	Paper Hrs	TH	TEST	PR	OR	TW	TOTAL
02	--	04	--	--	--	50#	--	25@	75

**Rationale:**

Manufacturing Technology is a core technology subject for mechanical Engg. Course. Manufacturing is the basic area for any mechanical engineering technician. The technician should be introduced to the basic processes of manufacturing. This subject will help the student to be familiarized with working principles and operations like forging, rolling, extrusion, press working, lathe, drilling, milling, casting, welding, brazing and soldering etc which are the basic manufacturing processes.

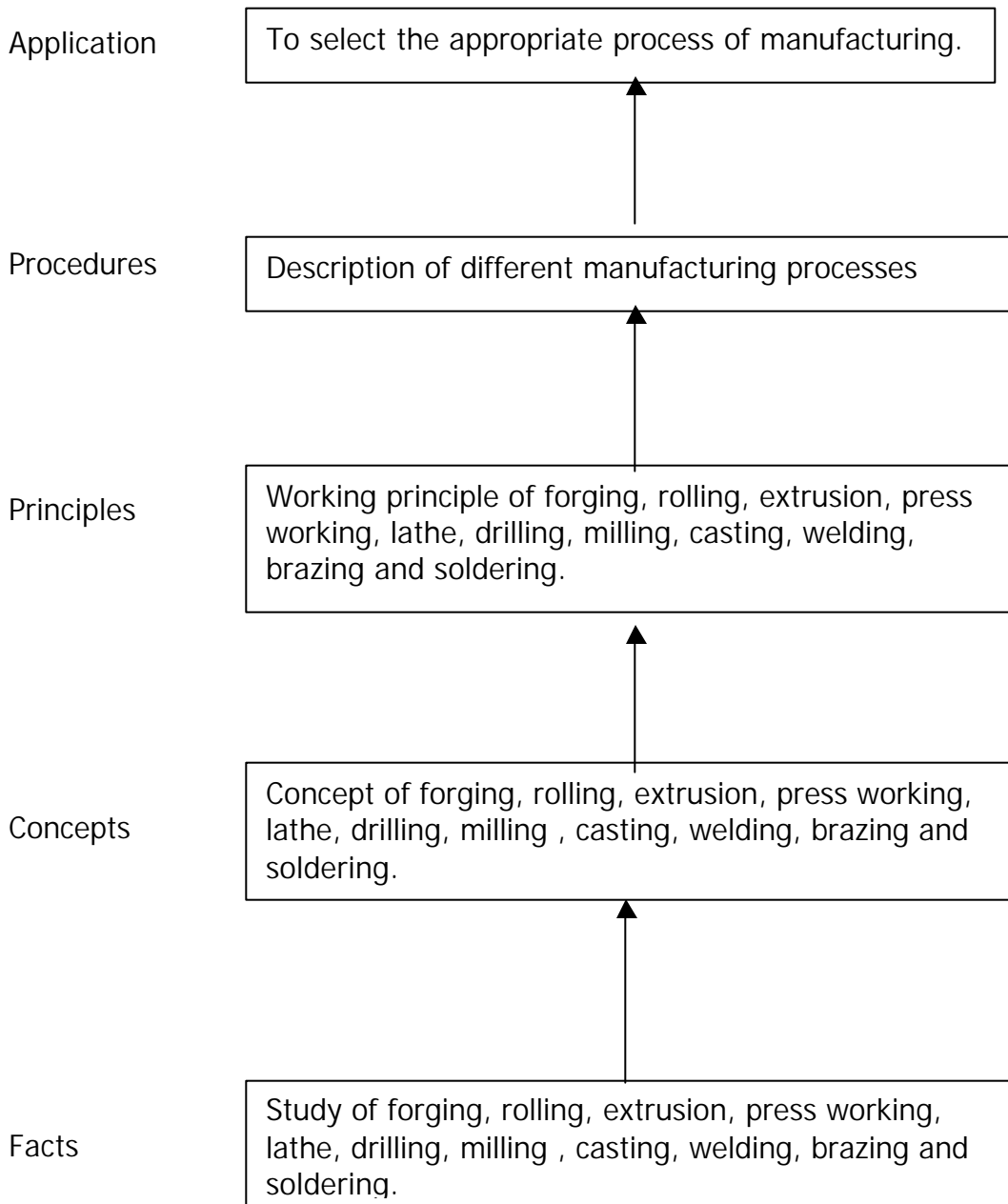
The basic knowledge of these processes will be helpful to select the most appropriate process for getting the desired results in terms of getting the raw material converted to finished product as per the requirements.

**Objectives:**

The student will able to

1. know and identify basic manufacturing processes for manufacturing different components.
2. operate & control different machines and equipments.
3. inspect the job for specified dimensions.
4. produce jobs as per specified dimensions.
5. select the specific manufacturing process for getting the desired type of output.
6. adopt safety practices while working on various machines.

**Learning structure:**



## Contents: Theory

Chapter	Name of the Topic	Hours
01	<b>Forging</b> 1.1 Forging Processes – Drop forging, Upset forging, Die forging or press forging. 1.2 Types of dies - Open Die, Closed Die(Single Impression and Multi-impression) Closed die Forging operations - Fullering, Edging, Bending, Blocking, Finishing 1.3 Forgeable material and forgeability, Forging temperature, Grain flow in forged parts, Types of Presses and hammers.	03
02	<b>Rolling and Extrusion</b> 2.1 Principles of rolling and extrusion. 2.2 Hot and cold rolling. 2.3 Types of rolling mills. 2.4 Different sections of rolled parts. 2.5 Methods of extrusion – Direct, Indirect, backward & impact Extrusion, Hot extrusion, Cold extrusion 2.6 Advantages, disadvantages and applications.	03
03	<b>Press working</b> 3.1 Types of presses and Specifications. 3.2 Press working operations - Cutting, bending, drawing, punching, blanking, notching, lancing 3.3 Die set components.- punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot. 3.4 Punch and die Clearances for blanking and piercing, effect of clearance.	04
04	<b>Lathe Operations</b> 4.1 Types of lathes – light duty, Medium duty and heavy duty geared lathe, CNC lathe. 4.2 Specifications. 4.3 Basic parts and their functions. Operations and tools – Turning, parting off, Knurling, facing, Boring, drilling, threading, step turning, taper turning.	03

05	<b>Drilling</b> 5.1 Classification. 5.2 Basic parts and their functions - Radial drilling machine. 5.3 Types of operations. 5.4 Specifications of drilling machine. 5.5 Types of drills and reamers	02
06	<b>Milling</b> 6.1 Classification. 6.2 Basic parts and their functions – column and knee type. 6.3 Types of operations 6.4 Types of milling cutters.	02
07	<b>Casting</b> 7.1 Patterns - Material used, types, Patterns allowances, Cores, Core allowances. 7.2 Moulds - Mould materials, Types of sand, Moulding processes Sand molding, Pit molding, machine molding. Shell molding. 7.3 Melting practice. Types of furnaces with specific application Cupola furnace, Electric arc furnace. 7.4 Casting principle and operation 7.5 Special casting processes. viz die casting, centrifugal casting, Investment casting. 7.6 Casting defects	08
08	<b>Welding</b> 8.1 Classification. 8.2 Gas welding techniques. 8.3 Types of welding flames. 8.4 Arc Welding – Principle, Equipment, Applications 8.5 Shielded metal arc welding. 8.6 Submerged arc welding. 8.7 TIG / MIG welding. 8.8 Resistance welding - Spot welding, Seam welding, Projection welding 8.9 Welding defects. 8.10 Brazing and soldering: Types, Principles, Applications	07
	Total	32

**Notes:** 1]The workshop instructors should prepare specimen job in each shop as demonstration practice before the student (as per the drawing given by subject teacher/ workshop superintendent)

- 2] Theory behind practical is to be covered by the concerned subject teacher/ workshop superintendent.
- 3] Workshop diary should be maintained by each student duly signed by respective shop instructors

### **Practical:**

Skills to be Developed:

Intellectual Skills:

1. Identify basic manufacturing processes
2. Understand need of pattern allowances
3. Identify joining methods for fabrication
4. Specify press tool dies for given cutting/forming operations
5. Understand various sand casting processes
6. Understand types of pattern, materials of construction and identify casting defects

Motor Skills:

1. Operate lathes, drilling, milling machines
2. Use welding machines and equipment
3. Set the tools, jobs and decide cutting parameters of machines
4. Make simple pattern out of wood/themocole
5. Inspect diamensions of jobs using measuring instruments

### **LIST OF PRACTICALS**

- 1) Assignment on forging die nomenclature.
- 2) One turning job on lathe containing the operations like plain turning, step turning, grooving, knurling, chamfering.
- 3) One composite welding job having two different joints. ( Batch of four students per job.)
- 4) One simple job on TIG / MIG welding setup or visit to TIG / MIG welding setup and write report.
- 5) One composite job containing the operations like face milling, side and face milling (slotting), drilling / tapping ( drilled hole should be perpendicular to slotting operation).
- 6) Making of one simple wooden Pattern (max. 4 students per group, each group should make different type of pattern).

- 7) Making of one Thermo-Cole Pattern (max. 4 students per group, each group should make different type of pattern).

**Learning Resources:**

**Books:**

Author	Title	Publisher
S. K. Hajra Chaudary, Bose, Roy	Elements of workshop Technology – Volume I & II	Media Promoters and Publishers limited
D. L. Wakyl	Processes and design for manufacturing	Prentice Hall
O. P. Khanna and Lal	Production Technology - Volume I & II	--
W.A.J. Chapman	Workshop Technology - Volume I , II & III	--
Jhon A Schey	Introduction to Manufacturing Processes	McGraw Hills International
M. Aduthan and A. B. Gupta	Manufacturing Technology	New Age International