

<b>MEL 101 -A</b>	<b>ELEMENTS OF MECHANICAL ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## **Section-A**

### **UNIT-I**

**Basic concept of thermodynamics:** Introduction, State, Work, Heat, Energy, Temperature, Zeroth, 1st, 2nd and 3rd law of thermodynamics, Concept of internal energy, enthalpy and entropy.

**Steam Generators:** Purpose, Classification of boilers, Fire tube and water tube boilers ( Difference), Mountings and accessories, Babcock & Wilcox, Cochran boilers (Construction and Working only).

### **UNIT-II**

**Hydraulic Turbines & Pumps :** Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Classification of water pumps and their working principle (Centrifugal & Reciprocating pumps)

**Stresses and Strains:** Introduction, Concept & types of Stresses and strains, Poison's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships, Numericals.

### **UNIT-III**

**Simple Lifting Machines:** Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single and double purchase winch crabs, Simple screw jack, Numericals.

**Power Transmission Methods and Devices:** Introduction to Power transmission, Belt drive, Rope drive, Chain drive, Pulley, Gear drive, Types of gears, Gear train, Clutch, Single plate clutch.

## **Section-B**

### **UNIT-IV**

**Manufacturing Processes:** Introduction to Manufacturing Processes and their Classification, Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accident, Methods of Safety, First Aid,

**Introduction to Machine Tools:** Lathe, Shaper, Planer, Milling (Specification, Construction, Part name and operations performed only).

### **UNIT-V**

**Foundry:** Introduction to Casting Processes, Basic Steps in Casting Processes, Pattern: Types of Pattern and Allowances, Sand Casting, Mould & Core making with assembly and its types. Gating System, Melting of Metal, Cupola Furnace, Metal Pouring, Fettling, Casting Defects.

### **UNIT-VI**

**Welding:** Introduction to welding, Classification of Welding Processes, GAS Welding: Oxy-Acetylene Welding, Types of Flames, Resistance Welding: Spot and Seam Welding and Projection Welding, Arc Welding: Metal Arc, Soldering & Brazing.

Text Books :

1. Elements of Mechanical Engineering- D.S. Kumar, S.K. Kataria and Sons.

2. Workshop Technology Vol. I & II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
3. Elements of Mechanical Engg.- R.K. Rajput, Laxmi Publications (P) Ltd.
4. Workshop Technology – S.K. Garg, University Press Ltd. New Delhi.
5. Manufacturing Processes – Virender Narula, S.K. Kataria & Sons, New Delhi.

Reference Books :

1. Strength of Materials- Popov, Pub. - PHI, New Delhi.
2. Workshop Technology, Vol. 1, 2, & 3- Chapman, WAJ Edward Arnold.
3. Basics of Mechanical Engg.- Vineet Jain, Dhanpat Rai and Sons Publishers, New Delhi.
4. Engineering Thermodynamics - P.K. Nag TMH, New Delhi.

<b>MEP 101-A</b>	<b>ELEMENTS OF MECHANICAL ENGINEERING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
		<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

### **List of Experiments**

1. To Study the Models for Cochran and Babcock & Wilcox boilers.
2. To study the Models for the constructional features and working of Pelton wheel Turbine, Francis Turbine and Kaplan Turbine.
3. To calculate Mechanical Advantage, Velocity Ratio and Efficiency of Single purchase and Double purchase winch crab and plot graphs.
4. To study simple screw jack & determine the efficiency.
5. To find the Mechanical Advantage, Velocity Ratio and Efficiency of a Differential Wheel & Axle.
6. To prepare a job on a lathe involving facing, turning, step turning, and parting-off.
7. To study different types of fitting tools and marking tools used in fitting practice.
8. To prepare mold and core assembly to put metal in the mold and fettle the casting.
9. To study various types of carpentry tools and prepare at least two wooden joints.
10. To prepare joints for welding suitable for butt welding and lap welding.
11. To Prepare a sheet metal component like funnel, tray, cone etc.