Course Code	Course Name	Hours per Week			Total	Total
		L	T	P	Hrs.	Credits
EN3ES03	Basic Mechanical Engineering	3	1	2	6	5

Unit-I Materials & Mechanical Measurement

Classification of Engineering material, Composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties, Alloy steel and their applications, stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials. Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

Unit-II Thermodynamics

Thermodynamic properties and systems, First and second law of thermodynamics, steam properties, thermal processes at constant pressure, volume, enthalpy & entropy, Refrigeration, vapor absorption & compression cycles, COP, refrigerant properties & eco friendly refrigerants.

Unit-III I.C. Engines

Description and working of four stroke petrol engines, two stroke petrol engines, four stroke diesel engines and two stroke diesel engines, relative merits and demerits.

Steam generators: Definition, Classification, general study of Cochran, Babcock Wilcox, Lancashire and Locomotive boilers, boilers mountings and accessories, Draught Classification, Calculation of Chimney height, boiler efficiency and numerical.

Unit-IV Centroid & Moment of Inertia

Location of centroid and Moment of Inertia of plane areas, Perpendicular Axis and Parallel Axis theorems, Product of Inertia, Principal Axes and Principal Moment of solid bodies.

Unit V Transmission of Power

Transmission of power through Belt, Rope and Gears, Ratio of tension on tight side and slack sides, Centrifugal tension. Gears: Helical, Spur, Bevel, Worm gearing, Rack and Pinion gear, Gear Trains, Simple and compound pulleys, Lifting machines.

Text Books:

1. R. Yadav Thermodynamics, Central Publishing House
2. P.K. Nag, Engineering Thermodynamics, McGraw Hill.
3. T.S. Rajan, Basic Mechanical Engineering, Wiley Eastern Ltd.
4. S.B. Mathur, S. Domkundwar, Elements of Mechanical Engineering, Dhanpat Rai & Sons.
5. S.K. Hazra Chaudhry, Elements of Workshop Technology Vol. I, Asia Publishing Co. Ltd.
6. M.L. Mathur, F.S. Mehta and R.P. Tiwari, Elements of Mechanical Engineering, Jain Brothers, New Delhi.

List of Practicals

1. Measurements using Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set.
2. Preparation of micro specimen.
3. To study micro structural characteristics of gray cast iron white cast iron and malleable cast iron.
4. Tensile Testing of standard mild steel specimen
5. Investigate the first law and Second law of thermodynamic using heat Engine
6. Study of different type of boilers and mounting
7. Study of various IC engines
8. To find the centriod of different plane laminas and to calculate their moment of inertia about different axis.
9. To find moment of inertia of flywheel.
10. To find Mechanical advantage and efficiency of Screw Jack.
11. To study different types of gears and their nomenclature.