

Learning Outcomes:

After learning this course one will be able to:

- Understand about the working, functions and applications of equipments used in daily life.
- Identify the broad context of Mechanical engineering problems, including describing the problem conditions and identifying possible contributing factors
- Understand the fundamental elements of Mechanical engineering systems, system components and processes, with a good understanding of associated safety, quality, schedule and cost considerations.
- Employ mathematics, science, and computing techniques in a systematic, comprehensive, and Rigorous manner to support the study and solution of Mechanical engineering problems.
- Synthesize analysis results to provide constructive and creative engineering solutions that reflect social and environmental sensitivities.
- Exhibit good teamwork skills and serve as effective members of multidisciplinary project teams.

Syllabus:

Unit No.	Topics
1	Introduction: I Prime movers, Sources of energy, Types of prime movers, Force and mass, Pressure, Work, Power, Energy, Heat, Temperature, Units of heat, Specific heat capacity, Interchange of heat, Change of state, Mechanical equivalent of heat, Internal energy, Enthalpy, Entropy, Efficiency, Statements of Laws of Thermodynamics, Calorific values Properties of gases: Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Internal energy, Relation between C_p and C_v , Enthalpy, Non flow process, Constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.
2	Properties of Steam: Introduction, Steam formation, Types of Steam, Enthalpy, Specific volume of steam and dryness fraction of steam, Internal energy, Steam tables, Non-flow process. Measurement of dryness fraction, Throttling calorimeter, Separating calorimeter, Combined calorimeter.
3	Steam Boilers: Introduction, Classification, Simple vertical boiler, Cochran boiler, Lancashire boiler, Locomotive boiler, Babcock and Wilcox boiler, Hi-Pressure boiler, functioning of different mountings and accessories. Internal Combustion Engines: Introduction, Classification, Engine details, otto four-stroke cycle, Diesel-four-stroke cycle, Difference between otto cycle and Diesel cycle, Two-stroke cycle, Difference between two-stroke and four-stroke cycle, indicated power (ip), Brake Power (bp), Efficiencies. Governors, I.C. Engine governing, Fly wheel.
4	Air Compressors:

Introduction, Uses of Compressed air, Reciprocating compressors, Operation of a compressor, multistage reciprocating compressors, Rotary compressors

Pumps:

Introduction, Reciprocating pump, types and operation, Bucket pump, Air Chamber, Centrifugal pumps, Types and Priming, Rotary pumps.

5 Refrigeration & Air Conditioning:

Introduction, Refrigerant, Types of refrigerators, Vapour compression refrigerating system, Vapour absorption refrigerating system, Window and split air conditioners.

Couplings, Clutches and Brakes:

Introduction, Couplings, Clutches, Brakes, Types of brakes. Difference between a brake and a clutch

6 Important Engineering Materials:

Properties of materials, Ferrous & Nonferrous materials and other important engineering materials such as Timber, Abrasive material, silica

Text Books

1. Elements of Mechanical Engineering, S.M. Bhatt, H.G. Katariya, Books India publication
2. Thermal Science and Engineering by Dr. D.S. Kumar, S.K. Kataria & sons, Publication New Delhi
3. Elements of Mechanical Engineering, Desai & Soni, AtulPrakashan

Reference Books

1. Basic Mechanical Engineering by Pravin Kumar, Pearson
2. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
3. Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
4. Introduction to Engineering Materials by B.K. Agrawal Tata Mcgrahill Publication, New Delhi