

Course Type	Course Code	Name of Course	L	T	P	Credit
ESC2	NMEE102	Basic Mechanical Engineering	3	0	0	3

Course Objective

The course aims to impart a basic understanding of various aspects of Mechanical Engineering.

Learning Outcomes

Upon successful completion of this course, students will:

- understand the basic requirements of Mechanical Engineering
- learn useful tools that will help throughout the engineering education
- be able to design and develop an in-depth understanding of Machines, Heat engines and hydraulic machines

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Forces in Structures: Forces, Moments of forces, Types of forces and moments, Analysis of statics problems	4	Basic knowledge of different types of forces and moments
2	Stresses and Strains: Stress-strain diagram, Elastic constants and their relationships, Thermal stress and strains, Principle stresses and principle planes	5	Understanding the stress and strain and relation between them for different types of structures.
3	Kinematics of Machines: Introduction to the theory of machines, Basic concepts of degree of freedom, Kinematic constants, Linkages and mechanisms, Robotics	6	Understanding about Link, Pair, Chains, Machines, Movement of machine parts and basic idea of Robotics.
4	Basic Fluid Mechanics: Introduction to Fluid Mechanics, Properties of fluid, classifications, Ideal fluids, Newtonian fluid and non-Newtonian fluids, Newton's law of viscosity, Fluid pressure and its measurement: Piezometers, Manometers, and Mechanical gauges.	8	Understanding of basic fluid mechanics
5	Kinematics and Dynamics of Fluid Flow: Continuity equation, Type of flow, Bernoulli's equation, Applications of Bernoulli's equation, Venturimeter.	6	Basic knowledge of kinematic and dynamics of fluid flow

6	Basic Thermodynamics: Introduction to Thermodynamics, Analysis of various thermodynamic processes, 1 st law of thermodynamics, 2 nd law of thermodynamics, P-V and T-S diagrams.	8	Understanding of basic engineering thermodynamics
7	Heat Engines: Analysis of air standard cycles-Otto, Diesel and Dual cycles, Classifications, Applications and performance estimation of internal combustion engines	5	Knowledge of different types of heat engines

Text Books

1. Engineering Thermodynamics: P. K. Nag, Mc Hill Education (India) Pvt. Ltd, New Delhi, Sixth edition (2017).
2. Thermodynamics - An Engineering Approach: Y A Cengel and M A Boles, Tata McGraw Hill.
3. Theory of Machines: S.S. Ratan

Reference Books:

4. Engineering Thermodynamics : C. P. Arora, Tata Mc Graw Hill
5. Fundamentals of Thermodynamics: Sonntag, B and Van Wylen, John
6. Introduction to Fluid Mechanics: Fox and McDonald's
7. Fluid Mechanics: Frank M White
8. Mechanics of materials: Beer and Johnston
9. Strenght of Materials: S. Rammautham
10. Strenght of Materials: D. Nag and Abhijit Chandra (Jhon willey publishers)

Aman Kumar