

BME154

Fundamentals Of Mechanical Engineering

Course category	: For Other Department
Pre-requisite Subject	: NIL
Contact hours/week	: Lecture: 3, Tutorial : 0 , Practical: 2
Number of Credits	: 4
Course Assessment methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Two Minor test and One Major Theory & Practical Examination
Course Objective	: NA

Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. The knowledge of basic laws of thermodynamics; steam generation and its properties; refrigeration cycles, properties and machines; and reciprocating engine such as two/four strokes IC engines.
2. The knowledge of measuring instruments, types of transducers for measurement of different geometrical parameters.
3. The ability to understand different types of stresses, Hooke's law and its applications, different mechanical properties of engineering materials.
4. The knowledge of different types of beams, shear force and bending moment diagrams for statically determinate beams, stresses in simple bending of beams and torsion in circular shafts.

Topics Covered

UNIT-I

9

Thermodynamics

First and second law of thermodynamics, statements of Second Law of Thermodynamics and their equivalence, Third law of thermodynamics, Steam properties, Steam processes at constant pressure, volume, enthalpy and entropy, Classification of steam boilers, boiler mounting and accessories, Refrigeration, Basics of Vapour compression and vapour absorption system, Coefficient of performance (COP), Refrigerants properties.

Reciprocating Machines

Carnot cycle, Otto and Diesel cycles, Working of two and four strokes petrol and diesel engines.

UNIT-II

9

Measurement & Metrology

Introduction to measurement and measuring instruments, Types of sensors and transducers and their characteristics, measuring error uncertainty analysis, Temperature, pressure, velocity, flow, strain, force and torque introduction of dial gauges, slip gauges and sine bar

Engineering Materials

Classification of materials, Ferrous and nonferrous metals, Composition of cast iron, carbon steel, alloy steel and their mechanical properties, Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. properties and its applications.

UNIT-III

9

Simple Stress and Strain

Introduction, Normal and shear stresses, Poisson's ratio, Elastic constants and their relationships, Hooke's law, Deflection of bars of uniform and varying cross-sections, Strain energy in due to static loading, Stress-strain diagrams for ductile and brittle materials

Mechanical Properties and Testing

Introduction to Toughness, Hardness, Fracture, Fatigue, Strength and deformation, Tensile, compression, Hardness, Impact, Fatigue, spring stiffness tests.

UNIT-IV

9

Beams

Introduction, Beams classification, types of loading, Free body diagram, Shear force and bending moment, Analysis of beams, Shear force and bending moment diagrams for statically determinate beams, Simple bending theory, Stress of beams of different cross sections

Torsion of Circular shafts

Introduction, Torsion of circular shafts, Shear stress due to torsion, Polar modulus, Power transmission

EXPERIMENTS

Note: Minimum Eight experiments are to be performed

1. Tensile strength test on universal testing machine.
2. Compressive strength test on universal testing machine.
3. Bend/rebend test on Izod.
4. Impact test on Impact testing machine.
5. Hardness testing on Vicker/Brinell hardness testing machine.

6. Torsion test of a rod on torsion testing machine.
7. Stiffness test on spring testing machine.
8. Study of two stroke and four stroke engine model.
9. Fatigue test on fatigue testing machine.
10. Deflection on bending of simple supported and cantilever beams.
11. Determination of COP of vapour absorption system.
12. Determination of COP of vapour compression refrigeration system.
13. Study of steam boilers model.

Study of domestic refrigerator

Books & References

1. Basic and Applied Thermodynamics-P. K. Nag (Tata McGraw Hill)
2. Basic Thermodynamics- Cengel(Tata McGraw Hill).
3. Applied Thermodynamics-Onkar Singh (New Age International)
4. Elements of Materials science and Engineering-Van Vlash (Jhon Wiley & Sons)
5. Material Science-V. Raghvan (Prentice Hall India Limited)
6. Mechanical Measurement-G. Beckwith Thomas (Narosa Publishing House)
7. Mechanical Measurement – Sirohi (New Age Publications)
8. Strength of Materials-S. Ramamurtham (Dhanpat rai Publishing Co.)
9. Strength of Materials-R. K. Rajput (S. Chand)
10. Strength of Materials–R. K. Bansal (Lakshmi Publications)

BHM-101/151

PROFESSIONAL COMMUNICATION

Course category	: Humanities & Social Science (HSS)
Pre-requisite Subject	: NIL
Contact hours/week	: Lecture: 2, Tutorial: 0, Practical: 0
Number of Credits	: 2
Course Assessment methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Two Minor tests and One Major Theory & Practical Examination.
Course Objective	: The course aims: <ol style="list-style-type: none"> 1) To sensitize the students to understand the role& importance of communication for personal & professional success. 2) To enable learners to exhibit knowledge, skills, and judgment in and around human communication that