

BASIC MECHANICAL ENGINEERING (THEORY) ME111

Pre-requisite: Engineering Physics

Credit Hours 03

Contact Hours 48

RECOMMENDED BOOKS

- Engineering mechanics and statics by R C Hibbeler, 13th edition

REFERENCE BOOKS

- A text book of Engineering Mechanics By R.S Khurmi , 20th Edition 2012
- Engineering Mechanics Dynamics, by J.L Merriam and L.G Kraige, John and Wiley sons, 8th Edition

OBJECTIVE OF COURSE

The Objective of this course is to learn basic concepts and system of forces, and enable students to understand relationship of physical processes, kinetics and kinematics. Develop skills to use the basic principles of mechanics in engineering applications.

S.NO	CLO/PLOS MAPPING	DOMAIN	PLO
01	Analyze the knowledge related to the concepts of equilibrium and its applications in civil engineering.	C4	01
02	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple practical problems.	C3	02
03	Apply the skills to use scalar and vector analytical techniques for analyzing forces in statically determinate structures.	C3	02
04	Apply basic knowledge of Math's and physics to solve real-world problems	C3	02

COURSE CONTENTS

Basic Concepts

- Concepts of space, time, mass, velocity, acceleration and force
- Scalar and vector quantities
- Newton's law of motion
- Law of gravitation

System of Forces

- Resultant and resolution of co-planer forces using parallelogram
- Sine law and cosine law for angle calculation
- Simple cases of resultant and resolution of forces in space

Equilibrium of a Particle

- concept of the free-body diagram for a particle.
- Cable, pulley and spring system
- Conditions of equilibrium of co-planar forces
- Analytical and graphical Formulations
- 3-Dimensional force system and its procedure for analysis.

Equilibrium of Rigid Bodies

- Free body concept, conditions of support and attachment to other bodies
- Support reactions under different types of loading
- Introduction to shear force and bending moment diagrams
- equilibrium of two-force and three-force bodies
- 3-Dimensional force system and its procedure for analysis.

Structural Analysis

- Determine the forces in the members of a truss using the method of joints and the method of sections.
- To analyze the forces acting on the members of frames and machines composed of pin-connected members.

Application of Principles of Dynamics

- Rectilinear and curvilinear motion
- Newton's equation of motion, dynamic equilibrium
- Introduction to practical use of the above principles and properties.