

Course Type	Course Code	Name of Course	L	T	P	Credit
	MEI101	Engineering Mechanics	3	1	0	11

#### Course Objective

The main objective is to develop in the engineering student the ability to analyse any real-life problem in a simple and logical manner using well-understood vector methods.

#### Learning Outcomes

Upon successful completion of this course, students will be able to:

- Apply the concepts of Engineering Mechanics to solve simple problems in mechanics.
- Analyze the Effect of forces on rigid body.
- Sketch the shear force diagram and bending moment diagram.
- Solve kinematic and dynamic systems.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	<b>Introduction: MODULE I: [3L]</b> Equilibrium of rigid bodies: Equivalent Force Systems; Wrench; Equilibrium of a Rigid Body in Three Dimensions	03	Students will have the ability to understand the concept of rigid bodies. They will be able to draw the free-body diagram before solving the mechanics problem. They should have idea of vector approach, particularly to solve the 3D problem.
2	<b>MODULE II: [5L]</b> Analysis of structures: Trusses, Frames and Machines	05	Student will get the concept of structure. They shall learn the analysis procedure of various kinds of engineering structure
3	<b>MODULE III : [5L]</b> Beams: Shear Force and Bending Moment Diagrams; Cables with concentrated and distributed loads	05	Student will be able to analysis (Shear forces and bending moment) the beam analytically as well as graphically.
4	<b>MODULE IV : [5L]</b> Friction: Wedges, Screw Jack and Belt Friction; Axle and Disk Friction	05	Student will learn how to solve the frictional problem of a machine parts.
5	<b>MODULE V: [5L]</b> Distributed forces: Centroids of Lines, Areas and Composite Plates; Center of Gravity; Moment of Inertia and Product of Inertia	05	Student will get the concept of centre engineering elements and effects of centre, the transformation of centre moment of inertia in engineering static and dynamic structure.
6	<b>MODULE VI: [3L]</b> Method of Virtual Work: Stability and Equilibrium	03	Student will learn to solve the structural problem using concept of virtual work with stability analysis.
7	<b>MODULE VII: [3L]</b> Kinematics of Particles: Motion Relative to a Frame, Tangential and Normal Components, Radial and Transverse Components	03	Students will get the knowledge of displacement, velocity and acceleration of particles and their relationship in engineering problem.
8	<b>MODULE VIII [3L]</b> Kinetics of Particles: Rate of Change of Angular Momentum, Impulse; Equations of Motion in Terms	03	Students will be able to understand the effect of forces on the motion of particles and they will be able to solve

	of Radial and Transverse Components, Work-Energy principle		the kinetic problem in different coordinate system.
9	<b>MODULE IX [5L]</b> Kinematics of Rigid Bodies: Rotation of a Rigid Body about a Fixed Axis, General Plane Motion; Instantaneous Center of Rotation in Plane Motion; Three Dimensional Motion: Coriolis Acceleration	05	Students will understand the three dimensional motion of rigid body.
10	<b>MODULE X [2L]</b> Case study: Solving real-life application problems through computer coding and simulation	02	Apply the basic Engineering Mechanics concepts to solve real problems.
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**Evaluation procedure:** Assignment: 5 %, Attendance: 5 %, Quiz / Class test: 10 %, Mid Semester Exam : 30 %, End Semester Exam : 50 %

**Text book:**

1. Vector Mechanics for Engineers by Beer and Johnston, McGraw Hill

**References:**

1. Engineering Mechanics: Statics and Dynamics by Irving Herman Shames
2. Engineering Mechanics by J.L. Meriam and L. Kraige

**Course Instructors:**

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