22BEAS106 ENGINEERING MECHANICS

Hours Per Week :

L	T	P	C
2	2	0	3

PREREQUISITE KNOWLEDGE: Basics of knowledge of physics and trigonometry.

COURSE DESCRIPTION AND OBJECTIVES:

To apply principles of mechanics for solving engineering problems, analyze reaction forces and moments of an equilibrium body directly or indirectly used in our real life, like machines and structures.

MODULE-1

UNIT-1   **8L+8T+0P=16 Hours**

SYSTEM OF FORCES:

Basic concepts of Engineering Mechanics. Force systems, Free body diagram and equilibrium of forces. Resultant of coplanar forces.

UNIT-2   **8L+8T+0P=16 Hours**

CENTROID AND MOMENT OF INERTIA:

Centroid, centroids of composite areas, Moment of inertia: polar moment of inertia, radius of gyration, polar radius of gyration of composite areas.

PRACTICES:

- Problems on composition and resolution of forces, moments of a force, couples, transmission of a couple, resolution of a force into a force & a couple.
- Problems relating to resultant of; Co-planer force system, collinear force system, concurrent force system, co-planer concurrent force system, co-planer non-concurrent force system.
- Problems relating to centroids of composite areas.
- Problems on moment of inertia, polar moment of inertia, radius of gyration, polar radius of gyration of composite areas.

MODULE-2

UNIT-1   **8L+8T+0P=16 Hours**

FRICTION:

Frictional forces: Classification of friction, Coefficient of friction, Laws of friction, angle of friction, Angle of repose and application of friction.

UNIT-2   **8L+8T+0P=16 Hours**

Analysis of simple framed structures using methods of joints, methods of sections and graphical method

PRACTICES:

- Problems involving frictional forces.
- Analysis of simple trusses by method of joints and method of sections.
- Analysis of simple trusses by graphical method.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the force resolution methods to determine resultants of any force system and the equivalent force system.	Apply	1	1, 2, 3, 9, 12
2	Apply the principle of framed structure to design green houses.	Apply	2	1, 2, 3, 9, 12
3	Analyze the centroid, first moment and second moment of composite areas.	Analyze	1	1, 2, 3, 9, 12
4	Analyze the mechanics problems associated with friction force.	Analyze	2	1, 2, 3, 9, 12

TEXT BOOKS:

1. Timoshenko S and Young D H, "Engineering Mechanics" McGraw Hill Book Co., New Delhi. 2018.
2. K. Tayal, "Engineering Mechanics", Umesh Publications, 2005.

REFERENCE BOOKS:

1. J. L. Meriam, L. G. Kraige, "Engineering Mechanics: Dynamics", 7th ed., John wiley & sons, 2012.
2. S. S. Bhavakati & J. G. Rajasekharappa, "Engineering Mechanics", 3nd ed., New Age International Publications, New Delhi, 2008.

SKILLS:

✓ *Analyzing system of forces*

✓ *Compute the centroid and moment of inertia of composite areas*

✓ *Demonstrate application of friction in daily life.*