

MEE11002	Engineering Mechanics	L	T	P	C
Version 1.0	Contact Hours - 45	3	0	0	3
Pre-requisites/Exposure	12th level Physics, Mathematics				
Co-requisites	--				

Course Objectives:

- To enable learners to solve force problems related to practical world.
- To be able to determine the centroid, centre of gravity and moment of inertia.
- To learn the effect of friction on equilibrium.
- To learn kinematics, kinetics of particle and rigid body, related principles.
- To introduce the concepts of Dynamic motion.

Course Outcomes:

On completion of this course, the students will be able to

CO1. Apply conditions of equilibrium of bodies subjected to forces

CO2. Determine the centroid, centre of gravity and moment of inertia of various one dimensional and two- dimensional objects

CO3. Analyze motion under the effect of dry friction

CO4. Apply the concept of virtual work for bodies in equilibrium

CO5. Apply the D'Alembert's Principle for reducing the problem of kinetics to equivalent statics problem.

Course Description:

Engineering Mechanics. This is a basic first level course to learn rigid body mechanics covering both statics and dynamics. Statics covers free body diagrams, equilibrium of rigid bodies, analysis of trusses and beams, discussion on friction, virtual work and stability. Students will be expected to be familiar with engineering problems related to practical field.

Course Content:

Units	Lecture Hours
Module-1: Basics of Statics and Concurrent Forces Statics of Particles: Force System: Force, classification & representation, force as a vector, composition and resolution of forces, principle of superposition and transmissibility of forces. Statics of Rigid bodies: Equilibrium of coplanar force system, free body diagrams, determination of reactions, equilibrium of a body under three forces, Lami's theorem. Moment of a force about a point and an axis, moment of coplanar force system, Varignon's theorem.	11

Units	Lecture Hours
Module-2: Parallel and Distributed Forces Parallel forces in a plane, Distributed Parallel forces in a plane, couple, resolution of a force into a force and a couple, moment of a couple. Centroid and Moment of Inertia: Determination of centre of gravity, centre of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia of composite plane figures and mass moment of inertia, radius of gyration, parallel axis theorem, Pappas theorems, polar moment of inertia.	11
Module-3: Friction: Introduction to wet and dry friction, laws of dry friction, cone of friction, block friction, ladder friction, wedge friction, application of friction in machines.	6
Module-4: Virtual Work Virtual displacement, principle of virtual work.	4
Module-5: Introduction to Dynamics Laws of motion, Projectile motion, D'Alembert's Principle, Work and energy, impulse and momentum, impact of bodies.	8

Text Books:

- Engineering Mechanics [Vol-I & II] by Meriam&Kraige, 5th ed. – Wiley India
- Engineering Mechanics by S.S. Bhavikatti and K.G. Rajashekarappa – New Age International
- Mechanics of Solids by Crandall,Dahl and Sivakumar-MC Graw Hill ,5th Edition 2015,New Delhi

Reference Books:

- Engineering Mechanics: Statics & Dynamics by I.H.Shames, 4th ed. – PHI
- Engineering Mechanics by Timoshenko, Young and Rao, Revised 4th ed. – TMH

Relationship between Course Outcomes (COs) and Program Outcomes (POs):

1=weakly mapped

2= moderately mapped 3=strongly mapped

Course Code	Course Name	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
MEE11	Enginee	CO1100	2	3	1	2	3	2	1	-	3	-	-	3	3	3	1
002	ring	2.1															
	Mechani	CO1100 2.2	3	2	2	1	3	2	1	-	3	-	-	2	3	2	1
		CO1100	2	2	2	2	1	1	3	-	3	-	-	2	3	1	3
		2.3															
		CO1100	3	3	3	3	1	2	1	-	3	-	-	3	2	3	3

Course Code	Course Name	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
		2.4															
		CO1100	3	2	2	3	2	3	3	-	1	-	-	2	2	3	3
		2.5															
		CO1100	2.	2.	2.	2.	2.	2.	1.	-	2.	-	-	2.4	2.6	2.4	2.2
		2	6	4	0	2	0	0	8		6						