

Engineering Mechanics

Course Code ME-107	Credit Hours 2-1
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Course Description

This course is setup to introduce students with basic concepts of Engineering mechanics based on equilibrium, principles and application of forces, calculation of resultants, geometrical properties related to different shapes and their application in Civil Engineering. Further to this an introduction to simple dynamics is given to the students.

Text Book:

1. Engineering Mechanics by J.L. Miriam, Latest Edition.

Reference Book:

1. Engineering Mechanics – Statics and Dynamics by R.C. Hibbeler.
2. Vector Mechanics for Engineers by Ferdinand P. Beer and E. Russell

Prerequisites

Nil

Assessment System for Theory

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

Assessment System for Lab

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assessment/ Viva	20%

Teaching Plan

Theory:

<u>Week</u>	<u>Topic Covered</u>	<u>Reading Assignment/ Home Work</u>	<u>CLO No.</u>	<u>Assessment Methodology</u>
1-3	Basics of Space, time, mass, velocity, acceleration, force Vectors and Scalars Newtons Law of Motion Forces and Moments, (polygon law and funicular polygon) Resolution of Forces Coplanar forces	Ref 1, Chap 1	1	Assignments, Quizzes, MSE, ESE
4-5	Equilibrium of Rigid Bodies(including resultant and resolution of co-planner forces)	Ref 1, Chap 2 HW 1	1	
6-8	Geometrical Properties of Plane Areas, (Including calculation of centroids and moments of inertia for simple and complex configurations, shifting of member moment of inertia to non-parallel global axis)	Ref 1, Chap 3 Quiz 1	1,2	
9	Mid Semester Exam			
10-13	Friction, (problems involving flat and curved surfaces) Coulomb's Law	Ref 1, Chap 8 Quiz 3	1,2	
14-15	Basics about beams, trusses & reactions, (Conditions for creation of reactions at typical supports)	Ref 1, Chap 12 HW 4	2	
16	Introduction to Kinematics including examples. Potential Energy, Kinetic Energy, Power, Work. Virtual Work for Coplanar forces with applications to simple cases. Introduction and Application of Principles of Dynamics. Curvilinear and Rectilinear Motion Introduction to Linear Circuit Analysis	Ref 1, Chap 8 Quiz 4	2	
17-18	End Semester Exam			

Practicals

S No.	Practical	Assessment Methodology	Learning Domain/ Taxonomy Level
1	To determine the surface area and volume of various shapes and objects in various systems of units	Project Reports, Lab Quiz, Viva	P3
2	To determine the tension in various points of a hanging rope loaded at different points		P3
3	Determine the center of gravity (centroid) of various		P3

	objects by analytical solution and experimental observations		
4	To prove that the body is in equilibrium when the sum of all clockwise moments is equal to the sum of all counterclockwise moments		P3
5	To verify the laws of friction between various surfaces and to find out the coefficient of friction		P3
6	To determine the reactions of a simply supported beam by following methods: a) Experimental observations (Using spring balances). b) Analytical solution (Using conditions of equilibrium)		P3