SEMESTER S2

ENGINEERING MECHANICS

Course Code	EMS103	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3-0-0-0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. The course aims to enable students to analyse and solve fundamental mechanics problems

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Introduction to statics: introduction to branches of mechanics, concept of rigid body scalars and vectors, vector operations, forces in space. Support reactions of beams (point load and UDL only) Force systems: rectangular components in 2D and 3D, moment and couple, resultants Equilibrium: system isolation and the free-body diagram, equilibrium conditions 2D and 3D	10
2	Friction: -laws of friction – analysis of blocks and ladder Centroid of composite areas- – moment of inertia- parallel axis and perpendicular axis theorems. Polar moment of inertia, radius of gyration, mass moment of inertia-ring and disc	10
3	Dynamics – rectilinear translation - equations of motion in kinematics and kinetics – D'Alembert's principle. –motion on horizontal and inclined surfaces, motion of connected bodies	8
4	Curvilinear translation - equations of kinematics projectile motion (solution starting from differential equations) Rotation – kinematics of rotation- equation of motion for a rigid body rotating about a fixed axis –rotation under a constant moment	8

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination- 1(Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Understand the vector representation of forces and moments	**K2**
CO2	Identify and describe the components of system of forces acting on the rigid body	**K3**
CO3	Apply the conditions of equilibrium to different force system.	**K3**
CO4	Identify appropriate principles to solve problems of mechanics.	**K3**
CO5	Develop the understanding of fundamental principles of rigid body dynamics	**K3**

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2									
CO2	3	3									
CO3	3	3									
CO4	3	3									
CO5	3	2									

Text Books

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
1	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publishers	5th Edition 2017
2	Engineering Mechanics: Combined Statics and Dynamics	Russell C. Hibbeler	Pearson Education,	14th Edition 2015
3	Engineering Mechanics - Statics and Dynamics,	Shames, I. H.	Prentice Hall ofIndia.	4th Edition 2008
4	Textbook of Engineering Mechanics	R. K. Bansal	Laxmi publications pvt ltd.	4th Edition 2016

Reference Books

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
1	Engineering Mechanics Statics	J. L. Meriam, L. G.	Wiley	*9th Edition 2020*
2	Engineering Mechanics	Kraige	PHI Learning	*2011*

Video Links (NPTEL, SWAYAM…)

	Link ID
1	https://nptel.ac.in/courses/112106286