

SEMESTER S2
ENGINEERING MECHANICS
(Common to EEE, CP, BR, RA & RU)

Course Code	GBEST213	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. To enable students to analyze basic mechanics problems and apply a vector-based approach to solve them.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	<p>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 on Simply supported and cantilever beams)</p> <p>Force systems: Rectangular components in 2D and 3D, moment and couple, resultants</p> <p>Equilibrium: system isolation and the free-body diagram, equilibrium conditions 2D and 3D</p>	10
2	<p>Friction: -Laws of friction – analysis of blocks and ladder</p> <p>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</p>	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. Combined motion of translation and rotation.	8
4	Mechanical vibration - Free and forced vibration, degree of freedom. Simple harmonic motion - spring mass model, period, stiffness, frequency, simple numerical problems of single degree of freedom	8

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

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
<ul style="list-style-type: none"> 2 Questions from each module. Total of 8 Questions, each carrying 3 marks <p style="text-align: center;">(8x3 =24marks)</p>	<ul style="list-style-type: none"> 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. <p style="text-align: center;">(4x9 = 36 marks)</p>	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	PO12
CO1	3	3										
CO2	3	3										
CO3	3	3										
CO4	3	3										
CO5	3	3										

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	5 th Edition 2017
2	Engineering Mechanics: Combined Statics and Dynamics	Russell C. Hibbeler	Pearson Education	14 th Edition 2015
3	Engineering Mechanics - Statics and Dynamics	Shames, I. H.	Prentice Hall of India	4 th Edition 2008

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. Kraige	Wiley	9 th Edition 2020
2	Engineering Mechanics	Chandramouli	PHI Learning	2011

Video Links (NPTEL, SWAYAM...)	
Module No.	Link ID
1	https://nptel.ac.in/courses/112106286
2	https://nptel.ac.in/courses/112106286
3	https://nptel.ac.in/courses/112106286
4	https://nptel.ac.in/courses/112106286