

Subject: Applied Mechanics								
Program: B.Tech.				Subject Code:			Semester: II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	Total
02	01	00	03	16/40	0	24/60	0	100

Course Objectives:

1. Understand the vectorial and scalar representation of forces and moments.
2. Describe static equilibrium of particles and rigid bodies in two dimension.
3. Analyse the properties of surfaces and solids in relation of moment of inertia.
4. Comprehend the effect of Friction on general plane motion.

Course Outcomes

On completion of the course student will be able to:

1. Identify the net effective force acting on the rigid body.
2. Develop the ability to analyze the beams for support reactions.
3. Draw free body diagram for various types of supports.
4. Represent moments & couples for rigid bodies.
5. Determine centroid for rectangle, circle & hollow sections.
6. Describe various laws of friction.

COURSE CONTENTS:

UNIT-I

[06]

Introduction

Beginning and Development of Engineering Mechanics, Fundamental Principles of Mechanics, Idealizations in Mechanics, Branches of Mechanics, Units

Coplanar Forces

Effect of Force, Characteristics of Force, Principle of Transmissibility of Forces, System of Forces, Resultant Force, Composition of Forces, Methods for Resultant Force, All major Laws of Forces, Principle of Equilibrium, Analytical Method for the Equilibrium of Coplanar Forces, Lami's Theorem

UNIT-II

[07]

Non-Coplanar Forces

Moment of a Force, Graphical Representation of Moments, Types of Moments, Varignon's Principle of Moments, Application of Moments, Levers, Types of Levers.

Beams

Types of Loads, Types of Supports, Types of Beams, Analytical Method for determination of Support Reactions of a Beam (Simply Supported Beam, Cantilever Beam)

UNIT-III

[07]

Friction

Static Friction, Limiting Friction, Normal Reaction, Angle of Friction, Coefficient of Friction, Laws of Friction, Equilibrium of a Body on a Rough Horizontal Plane, Equilibrium of a Body on a Rough Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Along the Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Horizontally. Ladder & Wedge Friction

UNIT-IV

[10]

Centre of Gravity

Centroid, Methods for Centre of Gravity, Centre of Gravity by Geometrical Considerations, Axis of Reference, Centre of Gravity of Plane Figures, Centre of Gravity of Symmetrical Sections, Centre of Gravity of Unsymmetrical Sections, Centre of Gravity of Solid Bodies, Pappus Guldinus Theorem

Moment of Inertia

Moment of Inertia of Plane area, Methods for Moment of Inertia, Moment of Inertia by Integration Method, Moment of Inertia of simple lamina, Parallel and Perpendicular Axis Theorem, Moment of Inertia of Built-up Section

Text Books:

1. H. J. Shah and S. B. Junnarkar, "Applied Mechanics", Charotar Publishing House Pvt. Ltd., 19th Edition, 2015.
2. S. Ramamrutham, "Engineering Mechanics", Dhanpat Rai Publishing Company (P) Limited, 1st Edition, 2008,

Reference Books:

1. R. C. Hibbeler, "Engineering Mechanics: Statics and Dynamics", Pearson Publication, 13th Edition, 2013.
2. F. P. Beer and E. R. Johnston, "Vector Mechanics for Engineers: Statics and Dynamics", McGraw Hill Publication, 11th Edition, 2016

Web resources:

1. Applied Mechanics (<http://nptel.ac.in/courses/122102004/>)
2. Core Applied Mechanics (<https://www.youtube.com/watch?v=7moNzhLQ6OA&list=PLC3A601B6060658D3>)
3. Civil-Mechanics of Solids (<https://www.youtube.com/watch?v=whB7IX3NQpg&list=PL4C9BB8DDD5D888A6>)
4. NOC: Engineering Mechanics Statics and Dynamics (https://www.youtube.com/watch?v=o_f1nQDtOOK&list=PLa4KQhDIgD7Rj8ulW4uFjqBmtzZe2rwDv)
5. Introduction to Engineering Mechanics (<https://www.mooc-list.com/course/introduction-engineering-mechanics-coursera>)
6. Applications in Engineering Mechanics (<https://www.mooc-list.com/tags/engineering-mechanics>)