Engineering Mechanics-II (Dynamics)

Semester No	Code	Credit Hours
3	ME-114	3-0

COURSE DESCRIPTION:

This course is designed to give the concept of motion of particles and rigid bodies. The concept is taught through studying motion without the influence of the forces (Kinematics) and under the influence of the force (Kinetics). This course aims to give students an understanding of principles of engineering dynamics including particle dynamics and rigid body dynamics (kinematics and kinetics) in two and three dimensional space, as well as to develop problem solving, computing and design skills in the areas of mechanism design and analysis.

TEXT AND MATERIAL

Textbooks:

1. Engineering Mechanics Statics & Dynamics by R C Hibbeler, Fourteenth edition

Reference Material:

1. Engineering Mechanics by S. Timoshenko & D.A Young
2. Engineering Statics by Beer & Johnstan

PREREQUISITE:

Engineering Mechanics- I: Statics

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student should be able to:

S No	CLO Statement	PLO	Learning Domain and level
1	Draw Free Body Diagram and solve problems related to particle or rigid body dynamics using Newton's second law applied to linear or angular motion	PLO 1	C3
2	Apply the principle of work and energy to solve problems related to kinetics of particles or rigid body planar kinetics.	PLO-1	C3
3	Apply the principles of linear and angular momentum to solve problems related to particles or to rigid boy planar kinetics.	PLO-1	C3

ASSESSMENT SYSTEM:

Quizzes	10-15%
Assignments	5-10%
OHTs	30-40%
ESE	40-50 %

TOPICS COVERED WITH THEIR CONTRIBUTION TO PLOs:

WeekNo	Description	Quizzes	Assignment	CLO No
1	Introduction to basic concepts of Dynamics	02	01	1
2	Kinematics of Particles: Rectilinear Kinematics, General Curvilinear Motion, Rectangular Components, and Motion of a Projectile,			
3	Curvilinear Motion: cylindrical, normal and tangential components.			
4	Kinetics of a Particle-Force and Acceleration: Newton's laws of motion, Equation of motion for a system of particles			
5	Equation of motion in rectangular, cylindrical and tangential coordinates			
6	Central-Force Motion and Space Mechanics.			
7	**OHT 1**			

8	Kinetics of a Particle-Work and Energy: Work of a force, Principle of work and energy for a system of particles	02	01	2
9	Power and efficiency, Conservative forces and energy. Utilize Work-Energy principles to find relationships between velocity and position.			
10	Kinetics of a Particle-Impulse and Momentum: Principle of linear impulse and momentum for a system of particles, Conservation of linear momentum for a system of particles,			
11	Impact, Angular momentum and angular Momentum of a system of particles. Utilize the Impulse-Momentum principles in cases of impact to find approximate solutions immediately after impact.			
12	Kinematics of a Rigid Body: Rigid body motion, Translation and rotation about a fixed axis			
13	**OHT 2**			
14	Relative motion analysis: Velocity and acceleration.	02	01	3
15	Kinetics of a Rigid Body-Force and Acceleration: Moment of inertia,			
16	Planar kinetics equations of motion: Translation, rotation about a fixed axis and general plane motion			
17	Revision			
18	**END SEMESTER EXAMINATION**			