



DYNAMICS

Course Code: 28567
Credits: 4
Course Type: Theoretical
Prerequisites: Statics
Co-requisite: Differential Equations
Course Length: 68 hours

Outline:

1- Introduction To Dynamics

2- Kinematics of Particles:

Rectilinear motion (1 Session), Plane Curvilinear Motion, rectangular Coordinates, Normal and Tangential Coordinates, Polar Coordinates (3 Sessions), space curvilinear motion (1 Session), Relative motion (1 Session), Constrained motion of Connected Particles (1 Session).

3- Kinetics of Particles:

Force, Mass, and Acceleration based on Newton's Second law Rectilinear Motion and Curvilinear Motion (2 Sessions), work and Kinetic energy (2 Sessions), Potential Energy (2 Sessions).

Impulse and Momentum, impact (2 Session), Kinetics of System of Particles, (1 Session).

4- Plane Kinematics of Rigid Bodies.

Rectilinear motion, Rotation about Fixed Point (1 Session), Rotation about Fixed Axis, Angular Velocity and Acceleration, Instantaneous Center of Zero Velocity (2 Session), Relative Acceleration (2 Sessions) , Motion relative to rotating axis (2 Sessions).

5- Plane Kinetics of Rigid Bodies:

General Equation of Motion (2 Sessions), work and energy Relations (2 Session), Impulse and Momentum equations (2 Sessions), Virtual Work (1 Sessions).



6- Three – Dimensional Dynamics of Rigid Bodies

Body and Space Cones in 3-d Motion. (1 Session) Angular Momentum, Kinetic Energy (2 Sessions), Momentum and Energy Equations of Motion (2 Sessions).

References:

1-*Engineering Mechanics: Dynamics*, by J.L. Meriam, L.G. Kraig ; John Wiley publishing, 1998.

2-*Engineering Mechanics: Dynamics*, by R.C. Hibbeler, Prentice Hall, 1992.

3- *Vector mechanics for Engineers: Dynamics*, Beer and Johnson, Mc Graw Hill, 1997.