10 CE301ENGINEERING MECHANICS

II B.Tech I Semester

(Common to Civil Engineering & Mechanical Engineering)

(with effect from the academic year 2011-2012)

Credits: 4

Lectures/Week : 4 hrs *Sessional marks:40*

UniversityExam:3hrsEnd Examination Marks: 60

UNIT - I

Statics: Introduction - units and dimensions - Law of mechanics, vectors, vectorial representation of forces and moments, vector operations. Coplanar and concurrent forces, resolution and composition of forces - Equilibrium of a particle - Equivalent systems of forces - Principle of transmissibility, single equivalent force, free body diagram- Types of supports and their reactions, equilibrium of rigid bodies in two dimensions.

UNIT – II

Properties of surfaces & solids: Determination of areas and volumes - First moment of area and the centroid - second and product moments of plane area - Parallel axis theorems and perpendicular axis theorems - Polar moment of inertia - Principal moments of inertia of plane areas - Principal axes of inertia.

UNIT – III

Friction : Types of friction - limiting friction - Laws of friction - Static and dynamic friction - motion of bodies –Belt drivers, open crossed and compound - length of belt, tension, tight side and slack side initial and centrifugal - Power transmitted and conditions for maximum power.

UNIT – IV

Dynamics: Displacement, velocity and acceleration, their relationship - Relative motion - Curvilinear motion - Newton's law of motion - Impulse and momentum - Impact of elastic bodies - Moment of Momentum Equations - Work energy equation, D' Alemberts Principle and its uses, Impulse and Momentum.

UNIT – V

Concept of Stress and Strain - Elasticity and Plasticity - Hooke's law - Stress- Strain diagram - tapered bars, Compound bars - Poison's ratio - Volumetric strain - relation between elastic constants - temperature stress - factor of safety - ductile and brittle materials under compression- endurance limit.

Text Books:

1. Engineering Mechanics : S.S.Bhavakatti
2. Engineering Mechanics : Tayal
3. Engineering Mechanics : RK. Bansal

REFERENCE:

1. Engineering Mechanics - Statics and Dynamics Beer and Johnson
2. Strength of Materials and Applied Mechanics :LP Prasad

3. Engineering Mechanics : Kumar K I
4. Engineering Mechanics : Timoshenko, Young and BaskarRao
5. Engineering Mechanics: Ferninand and Singer