SUBJECT NO-ME10001, SUBJECT NAME- Mechanics

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Force systems : Moment of a force about a point and about an axis; couple moment; reduction of a force system to a force and a couple.

Equilibrium : Free body diagram; equations of equilibrium; problems in two and three dimensions; plane frames and trusses.

Friction : Laws of Coulomb friction., problems involving large and small contact surfaces; square threaded screws; belt friction; rolling resistance.

Kinematics and Kinetics of particles : Particle dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables; central force motion.

Properties of areas : Moments of inertia and product of inertia of areas, polar moment of inertia, principal axes and principal moments of inertia.

Concept of stress and strain : Normal stress, shear stress, state of stress at a point, ultimate strength, allowable stress, factor of safety; normal strain, shear strain, Hooke’s law, Poisson’s ratio, generalized Hooke’s law; analysis of axially loaded members.

Torsion : Torsion of cylindrical bars, torsional stress, modulus of rigidity and deformation.

Flexural loading : Shear and moment in beams; load, shear and moment relationship; shear and moment diagrams; flexure formula; shear stress in beams; differential equation of the elastic curve, deflection of beams.

Transformation of stress and strain : Transformation of stress and strain, principal stresses, principal strains, Mohr’s circle for stress and strain.

Combined loading : Axial and torsional; axial and bending; axial, torsional and bending.

Column : Buckling of slender columns, Euler bucking load for different end conditions.