CE/BOS/ES201/0412

K L UNIVERSITY

ENGINEERING MECHANICS (11 – ES 201)

L	T	P	Cr
3	0	2	4

SYLLABUS

Force systems: Introduction, Forces acting at a point, 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 dimensions; Analysis of trusses by method of joints and sections..

Friction: Laws of Coulomb friction, problems involving large and small contact surfaces;

Properties of areas: Centroid and Centre of gravity, Moments of inertia of areas, polar moment of inertia, principal axes and principal moments of inertia

Kinetics of particles: Equation of motion for a particle in rectilinear motion – equations of motion for a particle in curvilinear motion in terms of x and y components and in terms of normal and tangential components – D`Alembert's principle-kinetic energy and potential energy – principle of work and energy

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, analysis of axially loaded members.

Torsion : Torsion of cylindrical bars, torsional stress, modulus of rigidity and deformation. Transformation of stress and strain, principal stresses, principal strains, Mohr's circle for stress and strain.

Text Books:

1. Engineering Mechanics S.Timoshenko, D.H.Young,J.V.Rao McGraw hill companies. Fourth edition
2. Mechanics of Materials – Gere and S.P.Timoshenko

Reference Book:

1. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers.
2. E. P. Popov, Engineering Mechanics of Solids
3. I. H. Shames, Introduction to Solid Mechanics

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LIST OF EXPERIMENTS

1. Modeling of simple truss in ProE and Meshing using Hyper Mesh and analysis for support reactions and forces in every truss element using RADIOSS.

2. Modeling of I Section channel sections using ProE and analysis of moments of inertia in Hypermesh and Radioss.

3. Modeling of a particle for a) rectilinear motion b) Curve linear motion using motion solve.

4. Modeling of a specimen using ProE, meshing in Hypermesh and analysis for stress vs. strain. Plot in Radioss and analyzing the results hence obtained through hyperview.

5. Modeling of a specimen using ProE, meshing in Hypermesh and analysis for torsional stress using Radioss and doing the rigiditymodulus of the material of the specimen.

6. Model a simple component in ProE, perform its meshing in Hypermesh, Apply (a) axial – tensile, compressive loads (b) eccentric loads and study the results there of in Radios.