B.E. FIRST YEAR (EC, IT, CE, MC, BM)
IT 103: ELEMENTS OF ENGINEERING MECHANICS
(In force from June 2006)

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Theory Hrs.	Theory Marks	Pract./Viva Marks	Termwork Marks	Total Marks
2	1	3	100	-	25	125

. Introduction: Scalar and vector quantities, composition and resolution of vectors, definition and units of space, time, matter and force, the science of mechanics, SI units.

2. Statics: Principles of statics, particle, rigid body, coplanar, concurrent and non-current, parallel and non-parallel forces, composition and resolution of forces, equilibrant, equilibrium, free body diagrams, Analytical and graphical conditions of equilibrium for co-planer force system.

3. Moment of Inertia: Centre of gravity of lines, plane areas, volumes and bodies, Pappus Guldinus theorem.

4. Friction: Theory of friction, static and sliding friction, Law of friction, angle and co-efficient of friction, inclined plane friction, ladder friction, wedges, belt and rope friction, screw friction.

5. Kinematics: Relative velocity, circular motion, constant and variable angular acceleration, relation between linear and angular acceleration, dependent motion, simple harmonic motion of rigid bodies, instantaneous center, introduction to simple cases of single degree free vibration.

6. Kinetics: Mass inertia, Newton's law of motion, De-Alembert's principle, force, absolute and derived units, gravitational force, engineer's units, constant and variable forces, motion of connected bodies, motion along
Inclined planes, momentum and impulse, work, energy-kinetic and potential, conservation of energy, power, conservation and momentum impact, torque, angular acceleration, energy of rotating bodies, flywheel and its function, angular momentum.

7. Simple Machines: Velocity ratio, mechanical advantage, efficiency, simple machine such as levers, inclined planes, pulley and pulley blocks, worm and compound screw jack etc., reversibility of machine.

8. Strength and Elasticity: Stresses (Axial, Normal, in plane, tensile, compressive, shear).

9. Elasticity: Elastic, homogeneous, isotropic, orthographic materials, limits of elasticity and proportionality, yield limit, ultimate strength, plastic state, proof stress, factor of safety, working stress, load factor.

10. Mechanical Properties of Materials: Metals, Ductility, Brittleness, Toughness, Malleability behavior of ferrous and non-ferrous metals in tension and compression, Fatigue strength, endurance limit, Creep of metals.

Text Books:

. Strength of materials By S.Ramamrutham and R.Narayan.
2. Engg. Mechanics. By A.K.Tayal.
3. Engg. Mechanics By P.J.Shah.