# Mechanics

**Work and Energy**  
6 hrs.  
Work done by a constant force and variable force-one dimensional case, Kinetic energy and work energy theorem, Conservative and non conservative forces, Conservative force as a negative gradient of potential energy, Conservation of energy, Elastic and inelastic collision.

**Elasticity**  
2 hrs.  
Stress and Strain, Elastic limit different types of elasticity, Young’s Modulus of elasticity, Modulus of rigidity and Bulk modulus of elasticity, Poission’s ratio,

**Surface tension**  
3 hrs.  
Molecular theory of surface tension, Surface energy, Angle of contact and capillary action, Osmosis pressure, Permeable and semi-permeable membrane.

**Viscosity and Pulsatile flow in an elastic tube**  
6 hrs.  
Laminar flow of liquid, Newton’s Formula for Viscous force, Coefficient of Viscosity, Poiseuilles formula for liquid flow in a capillary tube.  

**Radioecology**  
3 hrs.  
General aspects, Optical radiation, Ionizing radiations, Terrestrial radiation,

**Electricity**  
12 hrs.  
Charge, Coulomb’s law, Electric line of force, Electric field intensity and potential at any point due to an electric dipole, Electric field due to a circular loop, an infinite line of charge, uniform charge circular disc, infinite rood of charge, plane sheet of charge.  
Electric potential as the line integral of electric field, electric field as a negative gradient of potential, Electric potential energy, Equipotential surfaces.  
Electrical capacitance of a conductor, Energy of a charged conductor, Parallel plate air capacitor, Capacitance of a parallel plate capacitor with dielectric slab between plates, Dielectrics, Dielectric constant, Polar and non polar molecules, Dielectrics an atomic view, Gauss’s law in Dielectrics, Electric field intensity, Electric polarization, Electric displacement, Atomic polarizability, Electric susceptibility, relation between E,D and P.

Test Scheme: Written test (two), assignments and oral test (if necessary)

Recommended Books  
1. R. Resnick & Halliday  
   Physics part 1 & part 2  
2. M. Zamir.  
   The Physics of Pulsatile flow  
3. D. S. Mathur  
   Elements of properties of matter  
4. Berkley Physics series  
   Electricity & Magnetism  
5. Jurgen Kiefer  
   Biological radiation effects