

PH-121 APPLIED PHYSICS

Introduction: Scientific notation and significant figures. Types of errors in experimental measurements. Units in different systems. Graphical Techniques (Log, semi-log and other non-linear graphs)

Vectors: Review of vectors, Vector derivatives. Line and surface Integrals. Gradient of a scalar.

Mechanics: The limits of Mechanics. Coordinate systems. Motion under constant acceleration, Newton laws and their applications. Galilean invariance. Uniform circular motion. Frictional forces. Work and Energy. Potential Energy. Energy conservation. Energy and our Environment. Angular momentum

Electrostatics And Magnetism: Coulombs Law. Electrostatic potential energy of discrete charges. Continuous charge distribution. Gauss's Law. Electric field around conductors. Dielectrics. Dual trace oscilloscope with demonstration. Magnetic fields. Magnetic force on current. Hall effect. Biot-Savart Law. Ampere's Law. Fields of rings and coils. Magnetic dipole. Diamagnetism, Paramagnetism and Ferromagnetism. Semiconductor Physics: Energy levels in a semiconductor. Hole concept. Intrinsic and Extrinsic regions. Law of Mass Action. P-N junction. Transistor. Simple circuits.

Waves And Oscillations: Free oscillation of systems with one and more degrees of freedom Solution for Modes. Classical wave equation. Transverse modes for continuous string. Standing waves. Dispersion relation for waves. LC network and coupled pendulums. Plasma oscillations.

Optics And Lasers: Harmonic traveling waves in one dimension .Near and far fields. Two-slit interference. Huygens Principle. Single-slit diffraction. Resolving power of optical instruments. Diffraction Grating. Lasers. Population inversion. Resonant cavities. Quantum efficiency. He-Ne, Ruby and CO₂ lasers. Doppler effect and sonic boom.

Modern Physics : Inadequacy Of Classical Physics, Planck's Explanations Of Black Body Radiation Photoelectric Effect, Compton Effect. Bohr Theory Of Hydrogen Atom, Atomic Spectra, Reduce Mass, De-Broglie Hypothesis Braggs Law, Electron Microscope, Uncertainty Relations Modern Atomic Model, .Zeeman Effect, Atomic Nucleus, Mass-Energy Relation, Binding Energy, Nuclear Forces And Fundamental Forces, Exponential Decay And Half-Life. Radioactive Equilibrium In A Chain, Secular Equilibrium, Nuclear Stability, Radiation Detection Instruments, Alpha Decay, Beta Decay, Gamma Decay Attenuation Nuclear Radiation Hazards And Safety, Medical Uses Of Nuclear Radiation. Fission, Energy Release. Nuclear Reactors. Breeder Reactor. Nuclear Fusion. The practical work will be based on the above course