

Applied Physics – I (AS – 1002)

Course Code	AS- 1002	Credits-3	L- 3, T-1, P-0
Name of the Course	Applied Physics – I		
Lectures to be Delivered	52 (1 Hr Each) (L= 39, T = 13 for each semester)		
Semester End Examination	Max. Marks: 100	Min. Pass Marks: 40	Maximum Time:3hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max. Marks: 50

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D, and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 40% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each section will carry 15% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Physical optics: Interference- division of wavefront-fresnel's biprism, division of amplitude, interference by Newton's rings, michelson's interferometer and its applications
Diffraction- difference between fraunhofer and fresnel diffraction through slit, plane transmission grating, its dispersal and resolving powers Polarization- polarized and unpolarised light, double refraction, nicol prism, quarter and half wave plates, polarimetry. biquartz and laurents half shade polarimeters, simple concepts of photoelasticity.
Special theory of Relativity: Michelson-Moreley experiment, Relativistic transformations, Variation of mass with velocity, mass energy equivalence.

Section B

Wave and oscillations: Simple harmonic oscillations, simple concepts of harmonic oscillator, resonance, quality factor, E.M wave theory, Review of basic ideas, Maxwell's equations and their experimental basis. Simple plane wave equations, simple concepts of wave-guides and co-axial cables, poynting vector.
Dielectrics: Molecular Theory, polarization, displacement susceptibility, dielectric coefficient, permittivity and various relations between these Gauss's law in the presence of dielectric, energy stored in an electric field. Behaviour of dielectric in field – simple concepts, dielectric losses.

Section C

Quantum Physics: Difficulties with classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant. De Broglie Waves, Phase and Group Velocities, Particle diffraction, Uncertainty Principle, the wave equation., Postulates of quantum mechanics, Time dependent and independent Schrodinger equation, Expectation Values, Eigen Values and Eigen functions, Particle in a box, Finite Potential Well, Tunnel Effect, Harmonic oscillator. Statistical distributions, Maxwell Boltzmann Statistics, Quantum statistics.

Section D

Nuclear Physics: Neutron cross-section, nuclear fission, moderators, nuclear reactors, reactor criticality, interaction of radiation with matter-basic concepts, Radiation Detectors-ionization chamber, G.M counter, scintillations & solid state detectors, cloud Chamber & bubble chamber

Books:

1. Arthur Beiser, Concepts of Modern Physics, 5th International edition Tata McGraw Hill
2. Wehr, Richards & Adair, Physics of the Atom.
3. A.S.Vasudeva, Modern Engg. Physics-

