Annexure 2

APPLIED PHYSICS - I

Course Code: PHY 101 **Credit Units: 04**

Total Hours: 40

Course Objective:
Aim of this course is to introduce the students to fundamentals of graduate level physics, which form the basis of all applied science and engineering

Course Contents:

Module I: Electromagnetics: (10 Hours)
Scalar and vector fields, gradient of a scalar field, physical significance of gradient, equipotential surface. Line, surface and volume integrals, Divergence and curl of vector field and mathematical analysis physical significance, Electric flux, Gauss' law, Proof and Applications, Gauss divergence and Stokes theorems.
Differential form of Gauss' Law, Amperes' Law, Displacement current, Faradays Law, Maxwell equations in free space & isotropic media (Integral form & differential form), EM wave propagation in free space, Poynting vector.

Module II: Special Theory of Relativity: (10 Hours)
Michelson-Morley experiment, Importance of negative result, Inertial & non-inertial frames of reference, Einstein's postulates of Special theory of Relativity, Space-time coordinate system, Relativistic Space Time transformation (Lorentz transformation equation), Transformation of velocity, Addition of velocities, Length contraction and Time dilation, Mass-energy equivalence (Einstein's energy mass relation) & Derivation of Variation of mass with velocity,

Module III: Wave Mechanics: (10 Hours)
Wave particle duality, De-Broglie matter waves, phase and group velocity, Heisenberg uncertainty principle, wave function and its physical interpretation, Operators, expectation values. Time dependent & time independent Schrödinger wave equation for free & bound states, square well potential (rigid wall), Step potential.

Module IV: Semiconductor and Electronic Materials: (10 Hours)
Band Theory of Solids, Semi-conductors: Intrinsic and Extrinsic,Carreir concentration, Direct and indirect band-gaps, Types of Electronic materials, p-n Junction Diode,Diode Equation, Breakdown in p-n Junction Diode: Avalanche and Zener, Zener Diode and its applications photoconductivity and photovoltaics. Superconductivity, Meissner Effect, Type I and Type II Superconductors

Course Outcomes:

After successful completion of the course students will have the knowledge and skill to:

- Apply vector calculus to static electric-magnetic fields in different engineering situations.
- Analyze and Apply Maxwell's equation to diverse engineering problems.
- Relate semiconductor material properties to semiconductor devices.

Examination Scheme:

Components	Att.	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Physics of waves, W. C. Elmore & M. A. Heald
- Introduction to Electrodynamics, D. J. Griffith
- Engineering Physics, Satya Prakash
- Concept of Modern Physics, A. Beiser
- Solid State Physics, S. O. Pallai