

Subject Code: PH1L002	Name: Physics	L-T-P-C: 3-0-0-3
Prerequisite: None		
<p>Module 1: (Classical Physics) (12 hours) Lagrangian mechanics, constraints, Action principle, Lagrange's equations, Hamiltonian equations, central forces, Kepler's problem, waves and oscillations, damped and forced oscillations, normal modes, superposition, and resonance, Introduction to relativity.</p> <p>Module 2: (Electromagnetic waves) (10 hours) Maxwell's equations, wave equation, plane electromagnetic waves, longitudinal and transverse waves, superposition, wave packets, two- and three-dimensional waves, energy-momentum, Poynting's theorem, electromagnetic boundary conditions.</p> <p>Module 3: (Optics) (9 hours) Coherence, Laser, Young's experiment, interferometers, diffraction, Fraunhofer diffraction (single slit), dispersion, Single photon and applications</p> <p>Module 4: (Basics of Quantum Physics) (11 hours) Failure of classical physics, qualitative review of relevant experiments, de Broglie waves, uncertainty principle, wave function, probability interpretation, Schrodinger equation, Particle in a box, potential barrier, quantum tunneling, potential well, and harmonic oscillator.</p> <p>Text Books:</p> <ol style="list-style-type: none"> 1. Herbert Goldstein, Charles P. Poole, and John L. Safko, "Classical Mechanics", Pearson Education Inc., third edition, 2011. 2. H. J. Pain, "The Physics of Vibrations and Waves", John Wiley & Sons, Ltd, Sixth edition, 2015. 3. D. J. Griffiths, "Introduction to Electrodynamics," Cambridge University Press & Assessment, Fifth Edition, 2025. 4. Ajoy Ghatak, "OPTICS", McGraw-Hill Publication, Eighth edition, 2024 5. J. J. Sakurai and Jim Napolitano, "Modern Quantum Mechanics", Cambridge University Press, Third edition, 2020. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Frank S Crawford, "Waves – Berkeley Series", McGraw-Hill Publication, 1st edition, 2017. 2. Robert Resnick, "Introduction to Special Relativity", Wiley and Sons, 1st edition, 2007. 3. Feynman, Leighton, and Sands, "Lectures on Physics, Vol I, II, & III," Pearson Education, Millennium edition, 2012. 		