B. Tech. Courses offered by Physics Department

Course 1: Quantum Mechanics & Waves and Oscillations

Blackbody radiation and the concept of photons, Quantum mechanical operators, Schroedinger equation, Wave function, Statistical interpretation, Superposition Principle, Continuity equation for probability density, Stationary states, Bound states, Free-particle solution, 1-D infinite potential well, Expectation values and uncertainty relations, 1-D finite potential well, Quantum mechanical tunneling, Kronig-Penny model and emergence of bands.

General introduction to periodic motion, Simple harmonic motion (SHM), Equation of motion for SHM, Superposition of 2-vibrations, beats, Lissajous figures, Superposition of N-vibrations, Undamped and damped free vibrations, Forced vibrations, resonance, Practical examples of resonance, Coupled oscillations, Normal modes for 2-coupled oscillators, Normal modes for N-coupled oscillators, Fourier transforms and normal mode analysis, Wave equation, Superposition of waves, Phase and group velocity, Dispersion

Course 2: Quantum Mechanics & Electromagnetic Theory

Poisson's and Laplace's equations, Multipole expansion and dipole, Electric and magnetic fields in a medium, Concept of the vector potential and magnetic moment, Maxwell's equations, Boundary conditions, EM wave equation, Plane wave solutions, Poynting vector and intensity of the EM wave, Fields of moving charges, Lorentz oscillator model, Complex refractive index, Dispersion, Wave packet, Phase and Group velocities, Fresnel equation: Reflection and refraction of EM waves at a dielectric interface, EM waves in a conducting medium and plasma, Concept of Fourier transformation and its application

Blackbody radiation and the concept of the photon, Quantum mechanical operators, Schrodinger equation, Wave function, Statistical interpretation, Superposition Principle, the Continuity equation for probability density, Stationary states, Bound states, Free-particle solution, 1-D infinite potential well, Expectation values and uncertainty relations, 1-D finite potential well, Quantum mechanical tunneling, Kronig-Penny model and emergence of bands.