Physics (B.Tech I year course)

UG/PG: UG	**Department: Physics**
Course Code: PHT101	**Course Name: Physics**
Credits: 4	**L-T-P: 3-1-0**
Course Type: Core	
Pre-requisite course:	

Fields: gradient, divergence and curl and their physical significance, Gauss divergence theorem and Stokes theorem, laws of electromagnetism, equation of continuity, Maxwell's equations, wave equation, plane wave solution, light as e-m wave, wave phenomena, propagation of e-m wave in free space and dielectric media, Poynting theorem. [12 Lectures]

Radiation matter interaction, Compton effect, stimulated emission, Einstein coefficients; requirements for laser action, types of lasers- ruby and He-Ne laser; properties of laser radiation, directionality and coherence, applications of lasers.

[8 Lectures]

Wave particle duality, Heisenberg's uncertainty principle and its applications, concept of phase and group velocity, wave function, Quantum mechanical operators, Schrodinger equation-both time dependent and time independent, solution of Schrodinger equation in simple cases such as 1-D potential well, 3D- box, step potential and quantum mechanical tunneling, alpha decay, introduction to nuclear structures and forces, nuclear radiation and its detection.

[13 Lectures]

Free electrons in solids, concept of density of states and Fermi energy, Kronig-Penny model and emergence of energy bands, classification of materials, direct and indirect band gap semiconductors, superconductivity, recent advances/trends in Physics.

[9 Lectures]

Books Recommended:

1. Concepts of Modern Physics by Beiser (McGraw Hill)
2. Elements of Electromagnetics by Sadiku (Oxford University Press)
3. Introduction to Electrodynamics by Griffiths (Pearson)
4. Elements of Electromagentics by Seth (Dhanpat Rai & Co.)
5. Engineering Physics by Joshi (Mc Graw Hill)
6. Solid State Physics by Wahab (Narosa)
7. Solid State Physics by Pillai (Wiley Eastern Ltd.)
8. Essentials of Engineering Physics by A. S. Vasudeva (S. Chand)
9. W. R. Leo-Techniques for Nuclear & Particle Physics Experiments, Springer- Verlag 1987