APPLIED PHYSICS

Module-I (07 Classes)

Classical Dynamics

Principle of virtual work, De-Alembert Principle, Action principle, Langrage equation of motion and its application to Simple Harmonic oscillator. Velocity dependent potential**.**

Oscillation & Waves

Simple Harmonic Oscillation, damped harmonic oscillation, Forced oscillator, resonance, coupled oscillation, concept of wave and wave equation.

OPTICS

Concept of interference, two source interface pattern, Bi-prism, Michelson Interferometer & measurement of wavelength.

Diffraction: Hugen's principle, Fresenel&Frauhoper's diffraction, Zone plate.

Module-II (07 Classes)

Solid State Physics

Crystalline and amorphous solid, unit cell, Miller Indices, Reciprocal lattice, Bragg's law, Brillouin's zone, concept of fermions, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distribution function (only statement and formula), Concept of Fermions and Bosons. Classification of materials: metals, semiconductor and insulator in terms of band theory

LASER and Fibre Optics:

principle and application -stimulated emission, population inversion, Lasing material (solid and gas), He-Ne laser, Rubi- LASER, Application of LASER (Engineering Application), Principle of optical fibre and its application to communication.

Module-III (08 Classes)

Electromagnetism- Student will be familiarized with some basic used in vector calculus prior to development of Maxwell's electromagnetic wave equations. No proof of theorems and laws included in this unit expected- statement and interpretation should sufficient.

a) Vector calculus: gradient of scalar field, divergence, curl of vector field (Only Physical significance) Gauss divergence theorem, Stoke's theorem, Green's theorem (Only Statements)

b) Gauss's law of electrostatics in free space and in a medium(Only statements)electric displacement(**D)**magnetic Induction (**B**),Amperes circuital law (Only statements), displacement current, Faraday's law of electromagnetic induction(Only statements).

Module-IV(08 Classes)

Quantum Physics*:*Elementary concepts of quantum physics formulation to deal with physical systems.

a) Need for Quantum physics-Historical overviews, Particle aspects of radiation-Black body radiation, photoelectric effect, Compton scattering, pair production.(No derivations), Wave aspect of particles- matter wave, de Broglie Hypothesis, Heisenberg Uncertainty principles-Statement, Interpretation and example

b) Basic features of Quantum mechanics- Transition from deterministic to probabilistic, States of system- Wave function, probability density, superposition principle, observables and operators, expectation values. Schrodinger equation-Time dependent and time independent, wave packets.

Text Books:

1. Principle of Physics Vol. I & Vol. II by Md. M. Khan & S. Panigrahi (Cambridge Univ. Press).

2. Engineering Physics by D.K Bhattacharya and Poonam Tandon, Oxford University Press

3. Engineering Physics by D.R. Joshi, McGraw Hill

Reference Book:

1. Quantum Mechanics by Powel & Craseman.

2. Optics- A. K. Ghatak

3. Electricity & Magnetism : E.M. Purecell

4. Introduction to Electrodynamics- David J. Griffiths, PHI Publication

5. Concepts of Modern Physics – Arthur Beiser.

6. Engineering Physics- K.P.Mishra and P. Pattojoshi, Scitech Pub.

7. Physics-I for engineering degree students-B.B. Swain and P.K. Jena.

8. An Introduction to Machanics by D.Klippner& R. Kolenkow, TMH