UNIVERSITY SYLLABUS

Subject: Engineering Physics **Subject Code:** BAS101

Unit-1:- Quantum Mechanics: **(9)**

Inadequacy of classical mechanics, Planck's theory of black body radiation(qualitative), Compton effect, de-Broglie concept of matter waves, Davisson and Germer Experiment, Phase velocity and group velocity, Time-dependent and time-independent Schrodinger wave equations, Physical interpretation of wave function, Particle in a one-Dimensional box.

Unit-2:- Electromagnetic Field Theory **(8)**

Basic concept of Stoke's theorem and Divergence theorem, Basic laws of electricity and magnetism, Continuity equation for current density, Displacement current, Maxwell equations in integral and differential form, Maxwell equations in vacuum and in conducting medium, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Plane electromagnetic waves in conducting medium, Skin depth.

Unit-3:- Wave Optics **(10)**

Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications, Introduction to diffraction, Fraunhoffer diffraction at single slit and double slit, Absent spectra, Diffraction grating, Spectra with grating, Dispersive power, Resolving power, Rayleigh's criterion of resolution, Resolving power of grating.

Unit-4:-Fiber Optics & Laser **(9)**

Laser : Absorption of radiation, Spontaneous and stimulated emission of radiation, Population inversion, Einstein's Coefficients, Principles of laser action, Solid state Laser (Ruby laser) and Gas Laser (He-Ne laser), Laser applications.

Fiber Optics: Principle and construction of optical fiber, Acceptance angle, Numerical aperture, Acceptance cone, Step index and graded index fibers, Fiber optic communication principle, Attenuation, Dispersion, Application of fiber.

Unit-5:- Superconductors and Nano-Materials **(8)**

Superconductors: Temperature dependence of resistivity in superconducting materials, Meissner effect, Temperature dependence of critical field, Persistent current, Type I and Type II superconductors, High temperature superconductors, Properties and Applications of Super-conductors.

Nano-Materials: Introduction and properties of nano materials, Basics concept of Quantum Dots, Quantum wires and Quantum well, Fabrication of nano materials -Top-Down approach (CVD) and Bottom-Up approach (Sol Gel), Properties and Application of nano materials.

Reference Books:

1. Concepts of Modern Physics - AurthurBeiser (Mc-GrawHill)
2. Optics - Brijlal& Subramanian (S. Chand)
3. Engineering Physics: Theory and Practical- Katiyar and Pandey (WileyIndia)
4. Applied Physics for Engineers- Neeraj Mehta (PHI Learning,New)
5. Engineering Physics-Malik HK and Singh AK(McGraw-Hill)

Course Outcomes (COs) : On completion of course the students are able :

COs	CO Statement	Bloom's Level (KL)
CO1	To explain the distribution of energy in black body radiation and to understand the difference in particle and wave nature with explanation of Compton effect and Schrodinger wave equation.	K2 & K3
CO2	To understand the concept of displacement current and consistency of Ampere's law and also the properties of electromagnetic waves in different medium with the use of Maxwell's equations.	K2 & K4
CO3	To understand the behavior of waves through various examples/applications of interference and diffraction phenomenon and the concept of grating and resolving power.	K3
CO4	To know the functioning of optical fiber and its properties and applications. Tounderstand the concept, properties and applications of Laser.	K2 & K3
CO5	To know the properties and applications of superconducting materials and nano-materials.	K2

K1 – Remember K2 – Understand K3 – Apply
K4 – Analyze, K5 – Evaluate K6 – Create