

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE I Year (Common to all branches) (Part Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
APP2C2: Applied Physics	2	1	1	2	1	1	4
Duration of Theory Paper: 3 Hours							

Course Objectives: To introduce the fundamental concepts of physics that are useful in solving problems of engineering especially for semiconductors, optics, electromagnetism and quantum mechanics.

Prerequisite(s): nil

COURSE OF CONTENTS

UNIT-I

Optics-I: Interference of Light Waves: Thin film, Newton's Ring experiment, Michelson interferometer; Diffraction of Light Waves: Fresnel's & Fraunhofer diffraction, Zone plate, Single slit experiment, diffraction by double slit, Diffraction at Circular aperture, Plane transmission Grating.

UNIT-II

Optics-II: Polarization of Light Waves, Double refraction, Nicol Prism, Half Wave & Quarter Wave plates, Circularly & elliptically polarized light, Polarimeter; LASER: Stimulated & spontaneous emission, Population Inversion, Optical Resonator, Einstein's coefficients, He-Ne Laser, CO₂ Laser, Semiconductor Laser; Optical Fiber: types of Fibers (material, refractive index, mode), Acceptance angle, Numerical aperture, V-Number, Propagation of Light through Fibers, Applications.

UNIT-III

Crystal Structure and Semiconductors: Symmetry & properties of Simple crystal structure, Miller's Indices, Interplanar spacing, production and properties of x-ray, Bragg's law; Semiconductors: Band theory of Semiconductors, Intrinsic & extrinsic semiconductors, Fermi level, pn junction diode, LED, Zener diode, npn & pnp Transistors.

UNIT-IV

Electromagnetism: Continuity equation for Charge & Current, Inconsistency of Ampere's law for time varying field, Concept of Displacement current, Maxwell's equations; Wave equations for E & H, Propagation of one dimensional electromagnetic waves in dielectric medium, Energy density in electromagnetic field: Poynting Vector.

UNIT-V

Quantum Physics: Plank's law, Compton's effect, Concept of Matter Waves, Devison & Germer's experiment, Phase velocity & Group velocity, Heisenberg's Uncertainty Principle; Schrodinger's Wave Equation, Interpretation of Wave function Ψ , Time dependent & Time Independent equations, Schrodinger's Wave equation for a free particle in a box.

BOOKS RECOMMENDED:

- [1] R K Gaur & S L Gupta, Engineering Physics, Dhanpat Rai & Sons, 2006
- [2] H.K. Malik & A.K.Singh, Engineering Physics, Tata McGraw Hill, 2011
- [3] N. Gupta & S.K. Tiwary, A Text Book of Engineering Physics, Dhanpat Rai & Co. 2009.

- [4] W. T. Silfast, Laser Fundamentals Cambr. Un. Press, 1996,
- [5] D Halliday & R Resnick, Physics Vol-II, Wiley Eastern, 1993
- [6] H White, Modern Physics: Van Nostrand; 15/e.
- [7] D P Khandelwal, Optics and Atomic Physics.
- [8] R Feyaman, Feyaman Lectures on Physics, /e, Narosa Publication, 1998.
- [9] S.O. Pillai, Solid State Physics, New Age International Publication, 2010.
- [10] R.S. Sedha, A Text Book of Applied Electronic, S. Chand & company Lmt. 2005.
- [11] R.P. Goyal, Unified Physics-II,,and III Shivlal Agrawal & Co. ,1994.