I Year I Semester	L	T	P	C
Code: 20PH1002	3	0	0	3

APPLIED PHYSICS

Course Objectives:

1. Physics curriculum which is re-oriented to the needs of all branches of graduate engineering courses, that serves as a transit to understand the branch specific advanced topics.
2. To impart in-depth knowledge of Physics related to different engineering applications.
3. To introduce advances in science and technology for engineering applications

Course Outcomes:

1. Imparts Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
2. Understands the properties of matter waves and the physical phenomenon at the microscopic level.
3. Imparts knowledge on the mathematics, physical meaning of Maxwell's equation on which electromagnetic fields works on.
4. Understands the physics of Semiconductors and their working mechanism for their utility in sensors.
5. Explores the knowledge of magnetic and dielectric materials and their utility in appliances.

UNIT-I: WAVE OPTICS

Introduction – interference - Principle of Superposition of waves - Interference of light - Theory of Interference Fringes - Conditions for Sustained Interference - Interference in parallel films by reflection - Newton's Rings- Determination of Wavelength - Diffraction –differences between interference and diffraction –Fresnel's diffraction and Fraunhofer diffraction - Fraunhofer diffraction due to Single Slit - Diffraction Grating.

UNIT-II: QUANTUM MECHANICS

Introduction -Matter Waves – de-Broglie's hypothesis - Heisenberg's Uncertainty Principle - Interpretation of Wave Function –Schrödinger's time dependent and time independent Wave Equations -Particle in a Potential Box.

UNIT-III: ELECTROMAGNETIC FIELD THEORY

Introduction – Scalar and vector fields – Gradient of scalar – Divergence of vector - Curl of vector – Stoke's and Gauss's divergence theorems (Qualitative)- Maxwell's Equations(Integral and differential forms) - Electromagnetic Wave Propagation in non-Conducting media(Maxwell's wave equation).

UNIT-IV: SEMICONDUCTORS

Classification of Solids Based on Energy Bands - Fermi Energy - Intrinsic Semiconductors - Extrinsic Semiconductors (P-Type & N-Type) - Equation for electrical conductivity in semiconductors - Direct and Indirect Semiconductors - Drift and Diffusion Currents - Einstein's Continuity equation - Hall Effect- Hall Coefficient - Applications of Hall Effect.

UNIT-V: MAGNETISM & DIELECTRICS

Introduction -Magnetic Dipole Moment -Magnetization Magnetic Susceptibility and Permeability –Origin of Magnetic Moment - Bohr Magneton - Classification of Magnetic Materials - Dia, Para &Ferro - Domain Theory of Ferromagnetism Hysteresis - Soft and Hard Magnetic Materials - Applications of Magnetic Materials.

Introduction - Dielectric Polarization -Dielectric Polarizability -Susceptibility and Dielectric Constant - Types of Polarizations - Electronic and Ionic(Quantitative), Orientational Polarizations (Qualitative) - Frequency Dependence of Polarization -Applications of Dielectrics.

Text Books:

1. "A Text book of Engineering Physics"- by M.N. Avadhanulu, P.G. Kshirsagar, S. Chand Publications,2017
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.
4. "Engineering Physics" by H.K. Malik & A.K. Singh, McGraw Hill Publishing Company Ltd, 2018

Reference Books:

1. David J. Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education,2014
2. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill ,2008
3. Charles Kittel "Introduction to Solid State Physics", Wiley Publications,2011
4. S.M.Sze "Semiconductor devices-Physics and Technology"- Wiley,2008