S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
2	BSC-102	Engineering Physics	BSC	5	4	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to	
CO1	Use Maxwell"s equations to describe propagation of electromagnetic waves in a medium.
CO2	Use the concept of wave function to find the probability of a particle confined in a box.
CO3	Explain the basic properties of semiconductors including the band gap, charge carrier concentration, doping and charge carrier injection/excitation
CO4	Understand the concept of interference, diffraction and polarization of light
CO5	Understand and Articulate the working principle of lasers and optical fiber

Detailed Syllabus

Section A

Unit 1: Electromagnetic Fields and Waves: Concepts of Del Operator, Gradient, divergence, Curl, Displacement Current. Maxwell"s equations in vacuum and non-conducting medium, Electromagnetic wave propagation in free space (EM wave equations for electric and magnetic fields for free space) and their solutions (plane wave solution), Velocity of electromagnetic waves.

(10 Hrs)

Unit 2: Inadequacies of Classical Mechanics, de-Broglie"s concept of matter waves, Wave-packet (Wave-group), Phase and Group velocity, Heisenberg"s uncertainty Principle, Experimental illustration of Uncertainty principle using single slit.Wave function: Definition, Interpretation and its significance, Schrodinger"s Wave equation (Steady state and time dependent) for one dimension case, Concept of Operators and expectation Values, Applications of Schrodinger"s equation (Time Independent) to: a) Particle in a One Dimensional Box of infinite height, b) Single Step Potential Barrier.

(16 Hrs)

Unit 3: Semiconductor Physics: Structure of Atoms, Energy Band diagram, Metal, Insulator and Semiconductor, Intrinsic and extrinsic semiconductors, Direct and Indirect semiconductor. Bond in semiconductor and effect of temperature on semiconductors, Hole and electron description, charge densities in semiconductor, Generation and Recombination of charge carrier, Law of mobility and conductivity, current densities in semiconductors, Fermi levels, Mass action law, Drift and Diffusion currents.

(12 Hrs)

Section B

Unit 4: Applied Optics: Interference in thin films (by reflection and transmission of light), Theory of Newton"s rings by reflected light, Determination of wavelength and refractive index of monochromatic light by Newton"s rings theory, Fraunhofer and Fresnel"s diffractions, Fresnel"s half period zones and rectilinear propagation of light, Fraunhofer diffraction due to a single slit, Plane diffraction grating and its theory for secondary maxima and minima, Unpolarised and polarized light, Double refraction phenomenon, Nicol Prism, Mathematical representation of elliptically and circularly polarized light, Quarter and Half wave plates, Numerical problems.

(15 Hrs)

Unit 5: Principal of Laser action, Einstein"s coefficients, Ruby Lasers, Propagation of Light in Optical fibres, Acceptance angle and acceptance cone, Numerical Aperture, Single mode and Multimode fibres, Characteristics and General applications of Lasers and Optical fibres, Numerical problems.

(5 Hrs)

Text Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Fundamentals of Physics	Robert Resnick Jearl Walker, David Halliday	Wiley	10th (2015)
2	Concepts of Modern Physics	Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury	McGraw Hill Education	7th (2017)
3	Integrated Electronics	Jacob Millman	McGraw Hill Education	2nd (2009)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Engineering Physics	H. K. Malik and A. K. Singh	McGraw Hill Education	2nd (2017)
2	Engineering Physics	S. Sharma and J. Sharma	Pearson India	1st (2018)