

NIRMA UNIVERSITY
Integrated B. Tech. (CSE)-MBA programme
Term - I

L	T	P	C
2	1	2	4

Course Code	CSI0103
Course Title	Physics

Course Outcomes:

At the end of the course, students will be able to -

1. Acquire the knowledge of fundamental principles of physics and relate to the engineering science,
2. Apply the concepts of Physics for solving Engineering problems,
3. Relate principles of Physics for solving new and challenging problems of technology.

Syllabus:

**Teaching
hours: 20**

Unit I

10

Elementary Quantum Physics: Introduction to Quantum Physics: Particle in a three dimensional box,

Physics of Nanomaterials: Introduction – Nanoscale; Nanomaterials: Methods for synthesis of nanomaterials, Properties of nanomaterials – Electrical, Magnetic, Optical, Mechanical, Characterization techniques – X ray Diffraction (XRD) - Single Crystal, Powder and Laue techniques, Low energy Electron Diffraction (LEED), Scanning Electron Microscopy, Tunnelling Electron Microscopy, Nanostructures; Carbon nanotubes Characteristics and applications, Nanotechnology and environment.

Unit II

6

Lasers and Holography: Introduction, Basics of Interaction of radiation with matter, Condition for light Amplification, Population inversion and metastable state, pumping, the principle pumping scheme: Three and Four level scheme, Construction and working of optical resonator, Optical amplifier, Applications of laser beam, Holography.

Unit III

4

Introduction to Fiber Optics: Introduction of fiber-optic system, Principle and construction of fiber cable, Acceptance angle and numerical aperture, Types of Optical fiber: Based on material & based on mode of propagation, Index profile, Fiber optic communication link, Fiber optic sensor, Advantages of fiber optic system.

Self- Study:

Self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from the self-study contents.

Suggested Readings[^]:

1. M N Avadhulu and P. Kshirsagar, A Text Book of Engineering Physics, S Chand.
2. T. Pradeep, Nano: The Essentials, New Central book Agency.
3. B. L. Theraja, Physics for Engineers, S Chand Publication

L=Lecture, T=Tutorial, P=Practical, C=Credit

[^]this is not an exhaustive list

Experiments:

1. To estimate the solar energy in terms of solar power and V-I characteristics, Power load characteristics of the solar cell.
2. To evaluate the charge to mass ratio for electron by applying perpendicular magnetic field on the electron beam in CRT.
3. To measure the resistivity of semiconductor by four point probe method at different temperature.
4. Determination of forbidden energy band gap in a semiconductor using a junction diode.
5. To measure electrical resistivity by Hall Effect for semiconductor chip.
6. To measure the wavelength of light from sodium vapor lamp and find the thickness of thin film using Newton's rings method.
7. Curie Temperature measurement of ferromagnetic materials.