B.Sc. PHYSICS, w.e.f 2019 admission onwards

Programme Specific Outcomes

PSO1: Understand the basic concepts of methodology of science and the fundamentals of mechanics, properties of matter and electrodynamics

PSO2: Understand the theoretical basis of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics and thermodynamics

PSO3: Understand and apply the concepts of electronics in the designing of different analog and digital circuits

PSO4: Understand the basics of computer programming and numerical analysis

PSO5: Apply and verify theoretical concepts through laboratory experiments

Course Outcomes

PHY1B01: METHODOLOGY OF SCIENCE AND BASIC MECHANICS 36 hours (Credit - 2)

CO1	Understand the features, methods and limitations of science
CO2	Understand and apply the basic concepts of Newtonian Mechanics to physical systems
CO3	Understand and apply the basic idea of work-energy theorem to physical systems
CO4	Understand and apply the rotational dynamics of rigid bodies
CO5	Understand the basic ideas of elasticity

PHY2B02: MECHANICS 36 hours (Credit - 2)

CO1	Understand the features of non-inertial systems and fictitious forces
CO2	Understand and analyze the features of central forces with respect to planetary motion
CO3	Understand the basics ideas of harmonic oscillations
CO4	Understand and analyze the basics concepts of wave motion

PHY3B03: ELECTRODYNAMICS I 54 hours (Credit - 3)

CO1	Understand and apply the fundamentals of vector calculus
CO2	Understand and analyze the electrostatic properties of physical systems
CO3	Understand the mechanism of electric field in matter.
CO4	Understand and analyze the magnetic properties of physical systems
CO5	Understand the mechanism of magnetic field in matter.

PHY4B04: ELECTRODYNAMICS II 54 hours (Credit - 3)

CO1	Understand the basic concepts of electrodynamics
CO2	Understand and analyze the properties of electromagnetic waves
CO3	Understand the behavior of transient currents
CO4	Understand the basic aspects of ac circuits
CO5	Understand and apply electrical network theorems

PHY5B06: COMPUTATIONAL PHYSICS 54 hours (Credit – 3)

CO1	Understand the Basics of Python programming
CO2	Understand the applications of Python modules
CO3	Understand the basic techniques of numerical analysis
CO4	Understand and apply computational techniques to physical problems

PHY5B07: QUANTUM MECHANICS 54 hours (Credit – 3)

CO1	Understand the particle properties of electromagnetic radiation
CO2	Describe Rutherford – Bohr model of the atom
CO3	Understand the wavelike properties of particles
CO4	Understand and apply the Schrödinger equation to simple physical systems
CO5	Apply the principles of wave mechanics to the Hydrogen atom

PH5B08: OPTICS 54 hours (Credit - 3)

CO1	Understand the fundamentals of Fermat‟s principles and geometrical optics
CO2	Understand and apply the basic ideas of interference of light
CO3	Understand and apply the basic ideas of diffraction of light
CO4	Understand the basics ideas of polarization of light
CO5	Describe the basic principles of holography and fibre optics

PHY5B09: ELECTRONICS (ANALOG & DIGITAL) 54 hours (Credit – 3)

CO1	Understand the basic principles of rectifiers and dc power supplies
CO2	Understand the principles of transistor
CO3	Understand the working and designing of transistor amplifiers and oscillators
CO4	Understand the basic operation of Op – Amp and its applications
CO5	Understand the basics of digital electronics

PHY6B10: THERMODYNAMICS 54 hours (Credit - 3)

CO1	Understand the zero and first laws of thermodynamics
CO2	Understand the thermodynamics description of the ideal gas
CO3	Understand the second law of thermodynamics and its applications
CO4	Understand the basic ideas of entropy
CO5	Understand the concepts of thermodynamic potentials and phase transitions

PHY6B11: STATISTICAL PHYSICS, SOLID STATE PHYSICS, SPECTROSCOPY & PHOTONICS 54 hours (Credit - 3)

CO1	Understand the basic principles of statistical physics and its applications
CO2	Understand the basic aspects of crystallography in solid state physics
CO3	Understand the basic elements of spectroscopy
CO4	Understand the basics ideas of microwave and infra red spectroscopy
CO5	Understand the fundamental ideas of photonics

PHY6B12: NUCLEAR PHYSICS AND PARTICLE PHYSICS 54 hours (Credit - 3)

CO1	Understand the basic aspects of nuclear structure and fundamentals of radioactivity
CO2	Describe the different types of nuclear reactions and their applications
CO3	Understand the principle and working of particle detectors
CO4	Describe the principle and working of particle accelerators
CO5	Understand the basic principles of elementary particle physics

PHY6B13: RELATIVISTIC MECHANICS AND ASTROPHYSICS 54 hours (Credit - 3)

CO1	Understand the fundamental ideas of special relativity
CO2	Understand the basic concepts of general relativity and cosmology
CO3	Understand the basic techniques used in astronomy
CO4	Describe the evolution and death of stars
CO5	Describe the structure and classification of galaxies

Semester 6 | Core Course XIV (Elective) PHY6B14 (EL1): BIOMEDICAL PHYSICS 54 hours (Credit - 3)

CO1	Understand the basic principles of biophysics
CO2	Understand the fundamentals of medical instrumentation
CO3	Understand the principles of ultrasound and x-ray imaging
CO4	Understand the basic principles of NMR
CO5	Describe the applications of lasers in medicine

Semester 6 | Core Course XIV (Elective) PHY6B14 (EL2): NANOSCIENCE AND TECHNOLOGY 54 hours (Credit - 3)

CO1	Understand the elementary concepts of nanoscience
CO2	Understand the electrical transport mechanisms in nanostructures
CO3	Understand the applications of quantum mechanics in nanoscience
CO4	Understand the fabrication and characterization techniques of nanomaterials
CO5	Enumerate the different applications of nanotechnology

Semester 6 | Core Course XIV (Elective) PHY6B14 (EL3): MATERIALS SCIENCE 54 hours (Credit - 3)

CO1	Understand the basic ideas of bonding in materials
CO2	Describe crystalline and non crystalline materials
CO3	Understand the types of imperfections and diffusion mechanisms in solids
CO4	Describe the different properties of ceramics and polymers
CO5	Describe the different types of material analysis techniques

PHY4B05: PRACTICAL I 36 hours in each semester (Credit - 5)

CO1	Apply and illustrate the concepts of properties of matter through experiments
CO2	Apply and illustrate the concepts of electricity and magnetism through experiments
CO3	Apply and illustrate the concepts of optics through experiments
CO4	Apply and illustrate the principles of electronics through experiments

PHY6B15: PRACTICAL II 72 hours in each semester (Credit - 5)

CO1	Apply and illustrate the concepts of properties of matter through experiments
CO2	Apply and illustrate the concepts of electricity and magnetism through experiments
CO3	Apply and illustrate the concepts of optics and spectroscopy through experiments
CO4	Apply and illustrate the principles of heat through experiments

PHY6B16: PRACTICAL III 72 hours in each semester (Credit - 5)

CO1	Apply and illustrate the principles of semiconductor diode and transistor through experiments
CO2	Apply and illustrate the principles of transistor amplifier and oscillator through experiments
CO3	Apply and illustrate the principles of digital electronics through experiments
CO4	Analyze and apply computational techniques in Python programming

Course: PHY6B17(P) – PROJECT 36 hours in each semester (Credits: 2)

CO1	Understand research methodology
CO2	Understand and formulate a research project
CO3	Design and implement a research project
CO4	Identify and enumerate the scope and limitations of a research project

PHY6B17(R): RESEARCH METHODOLOGY (In lieu of Project) 36 hours in each semester (Credits: 2)

CO1	Understand research methodology
CO2	Understand the concept of measurement in research
CO3	Understand the significance and limitations of experimentation in research
CO4	Understand and formulate a research project, ethics and responsibility of scientific research