DEPARTMENT OF PHYSICS

PROGRAM OUTCOME

PO1: Identify, formulate and solve the complex problems in the field of theoretical physics, condensed matter physics and electronics.

PO2: Recognize the need for and have an ability to engage in lifelong learning and be able to demonstrate knowledge of contemporary issues.

PO3: Plan, execute and report the results of a complex extended experiment or investigation, using appropriate methods to analyze data and to evaluate the level of its uncertainty

PO4: Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO5: Communicate the in the scientific language effectively in oral and written form.

PO6: Acquire basic knowledge, skills and attitudes necessary for adapting to a fast changing technological world and understand the technological development of computers

PROGRAMME SPECIFICATION

Programme Title	B.Sc. Physics
Pattern of Delivery	Full Time
Programme Length	3 Years

PROGRAMME SPECIFIC OUTCOMES

PSO1: Understand the basic concepts of 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 OUTCOME

Delivery Pattern	Paper	Paper Code	Outcome
First Semester	MECHANICS – I	PHY1 B01	• Understand and apply the basic concepts of Newtonian Mechanics to Physical System • Understand and apply the basic idea of work-energy theorem to physical systems • Understand and apply the rotational dynamics of rigid bodies
Second Semester	MECHANICS – II	PHY 2 B02	• Understand the features of non-inertial systems and fictitious forces • Understand and analyze the features of central forces with respect to planetary forces • Understand the basic ideas of Harmonic Oscillations • Understand the analyze the basic concepts of wave motion
Third Semester	ELECTRODYNAMICS I	PHY3B03	• Understand and apply the fundamentals of vector calculus • Understand and analyze the electrostatic properties of physical systems • Understand the mechanism of electric field in matter. • Understand and analyze the magnetic properties of physical systems • Understand the mechanism of magnetic field in matter.
Fourth Semester	ELECTRODYNAMICS II	PHY4B04	• Understand the basic concepts of electrodynamics • Understand and analyze the properties of electromagnetic waves • Understand the behavior of transient currents • Understand the basic aspects of ac circuits • Understand and apply electrical network theorems
Fourth Semester	PRACTICAL I	PHY4B05	• Apply and illustrate the concepts of properties of matter through experiments • Apply and illustrate the concepts of electricity and magnetism through experiments • Apply and illustrate the concepts of optics through experiments • Apply and illustrate the principles of electronics through experiments
Fifth Semester	COMPUTATIONAL PHYSICS	PHY5B06	• Understand the Basics of Python programming • Understand the applications of Python modules • Understand the basic techniques of numerical analysis • Understand and apply computational techniques to physical problems

Fifth Semester	QUANTUM MECHANICS	PHY5B07	• Understand the particle properties of electromagnetic radiation • Describe Rutherford – Bohr model of the atom • Understand the wavelike properties of particles • Understand and apply the Schrödinger equation to simple physical systems • Apply the principles of wave mechanics to the Hydrogen atom
Fifth Semester	OPTICS	PHY5B08	• Understand the fundamentals of Fermat's principles and geometrical optics • Understand and apply the basic ideas of interference of light • Understand and apply the basic ideas of diffraction of light • Understand the basics ideas of polarization of light • Describe the basic principles of holography and fibre optics
Fifth Semester	ELECTRONICS (ANALOG & DIGITAL)	PHY5B09	• Understand the basic principles of rectifiers and dc power supplies • Understand the principles of transistor • Understand the working and designing of transistor amplifiers and oscillators • Understand the basic operation of Op – Amp and its applications • Understand the basics of digital electronics
Fifth Semester	NON CONVENTIONAL ENERGY SOURCES	PHY5D01(1)	• Understand the importance of non - conventional energy sources • Understand basic aspects of solar energy • Understand basic principles of wind energy conversion • Understand the basic ideas of geothermal and biomass energy and recognize their merits and demerits • Understand the basic ideas of oceans and chemical energy resources and recognize their merits and demerits
Sixth Semester	THERMODYNAMICS	PHY6B10	• Understand the zero and first laws of thermodynamics • Understand the thermodynamics description of the ideal gas • Understand the second law of thermodynamics and its applications • Understand the basic ideas of entropy • Understand the concepts of thermodynamic potentials and phase transitions
Sixth Semester	STATISTICAL PHYSICS, SOLID STATE PHYSICS, SPECTROSCOPY &	PHY6B11	• Understand the basic principles of statistical physics and its applications • Understand the basic aspects of crystallography in solid state physics

	PHOTONIC		• Understand the basic elements of spectroscopy Understand the basics ideas of microwave and infrared spectroscopy • Understand the fundamental ideas of photonics
Sixth Semester	NUCLEAR PHYSICS AND PARTICLE PHYSICS	PHY6B12	• Understand the basic aspects of nuclear structure and fundamentals of radioactivity • Describe the different types of nuclear reactions and their applications • Understand the principle and working of particle detectors • Describe the principle and working of particle accelerators • Understand the basic principles of elementary particle physics
Sixth Semester	RELATIVISTIC MECHANICS AND ASTROPHYSICS	PHY6B13	• Understand the fundamental ideas of special relativity • Understand the basic concepts of general relativity and cosmology • Understand the basic techniques used in astronomy • Describe the evolution and death of stars • Describe the structure and classification of galaxies
Sixth Semester	NANOSCIENCE AND TECHNOLOGY	PHY6B14 (EL2)	• Understand the elementary concepts of nanoscience • Understand the electrical transport mechanisms in nanostructures • Understand the applications of quantum mechanics in nanoscience • Understand the fabrication and characterization techniques of nanomaterials • Enumerate the different applications of nanotechnology
Sixth Semester	PRACTICAL II	PHY6B15	• Apply and illustrate the concepts of properties of matter through experiments • Apply and illustrate the concepts of electricity and magnetism through experiments • Apply and illustrate the concepts of optics and spectroscopy through experiments • Apply and illustrate the principles of heat through experiments
Sixth Semester	PRACTICAL III	PHY6B16	• Apply and illustrate the principles of semiconductor diode and transistor through experiments • Apply and illustrate the principles of transistor amplifier and oscillator through experiments • Apply and illustrate the principles of digital electronics through experiments • Analyze and apply computational techniques in Python programming

Sixth Semester	PROJECT	PHY6B17(P)	• Understand research methodology • Understand and formulate a research project • Design and implement a research project • Identify and enumerate the scope and limitations of a research project

COMPLEMENTARY PHYSICS

COURSE OUTCOME

Delivery Pattern	Paper	Paper Code	Outcome
First Semester	Properties of matter & Thermodynamics	PHY1C01	• Understand the basic principles of elasticity • Understand the concepts of surface tension • Understand the aspects of viscosity • Understand the basic principles of Thermodynamics
Second Semester	Optics, Laser & Electronics	PHY2C02	• Understand the basic concepts of interference and diffraction • Understand the concepts of polarization • Understand the fundamentals of electronics • Understand the important principles of laser physics
Third Semester	Mechanics, Relativity, Waves and Oscillations	PHY3C03	• Understand the basic ideas of frames of reference and the principles of conservation of energy and momentum • Understand the concepts of relativity • Understand the basic ideas of oscillations and waves • Understand the basic ideas of modern Physics
Fourth Semester	Electricity, Magnetism and Nuclear physics	PHY4C04	• Understand the basic ideas of static and current electricity • Understand the concepts of magnetism • Describe the fundamental concepts of nuclear physics • Understand the basic ideas of cosmic rays and elementary particles
Fourth Semester	PHYSICS PRACTICALS I	PHY4C05	• Apply and illustrate the concepts of properties of matter through experiments • Apply and illustrate the concepts of electricity and magnetism through experiments • Apply and illustrate the concepts of optics through experiments • Apply and illustrate the principles of electronics through experiments