B.Sc PHYSICS PROGRAMME

Programme Specific Outcomes (PSOs)

PSOs	Program 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 (COS):

CORE COURSE OUTCOMES (COs)

THEORY

CORE COURSE 1

PAPER CODE & NAME: PHY1B01: METHODOLOGY OF SCIENCE AND BASIC MECHANICS

Cos	Course Outcome Statements
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

CORE COURSE 2

PAPER CODE & NAME: PHY2B02: MECHANICS

Cos	Course Outcome Statements
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

CORE COURSE 3

PAPER CODE & NAME : PHY3B03: ELECTRODYNAMICS I

Cos	Course Outcome Statements
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

CORE COURSE 4

PAPER CODE & NAME: PHY4B04: ELECTRODYNAMICS II

Cos	Course Outcome Statements
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

CORE COURSE 5

PAPER CODE & NAME: PHY5B06: COMPUTATIONAL PHYSICS

Cos	Course Outcome Statements
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

CORE COURSE 6

PAPER CODE & NAME: PHY5B07: QUANTUM MECHANICS

Cos	Course Outcome Statements
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

CORE COURSE 7

PAPER CODE & NAME: PH5B08: OPTICS

Cos	Course Outcome Statements
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

CORE COURSE 8

PAPER CODE & NAME: PHY5B09: ELECTRONICS (ANALOG & DIGITAL)

Cos	Course Outcome Statements
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

CORE COURSE 9

PAPER CODE & NAME: PHY6B10: THERMODYNAMICS

Cos	Course Outcome Statements
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

CORE COURSE 10

PAPER CODE & NAME: PHY6B11: STATISTICAL PHYSICS, SOLID STATE PHYSICS, SPECTROSCOPY & PHOTONICS

Cos	Course Outcome Statements
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

CORE COURSE 11

PAPER CODE & NAME: PHY6B12: NUCLEAR PHYSICS AND PARTICLE PHYSICS

Cos	Course Outcome Statements
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

CORE COURSE 12

PAPER CODE & NAME: PHY6B13: RELATIVISTIC MECHANICS AND ASTROPHYSICS

Cos	Course Outcome Statements
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

ELECTIVE CORE COURSE- III (Theory)

PAPER CODE & NAME: PHY6B14 (EL3): MATERIALS SCIENCE

Cos	Course Outcome Statements
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

PRACTICAL

PRACTICAL 1

PAPER CODE & NAME: PHY4B05: PRACTICAL I

COs	Course Outcome Statements
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

PRACTICAL 2

PAPER CODE & NAME: PHY4B05: PRACTICAL II

COs	Course Outcome Statements
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

PRACTICAL 3

PAPER CODE & NAME: PHY4B05: PRACTICAL III

COs	Course Outcome Statements
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

PROJECT

PAPER CODE & NAME: PHY6B17(P)

COs	Course Outcome Statements
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

PAPER CODE & NAME: PHY6B17(R): RESEARCH METHODOLOGY (In lieu of Project)

COs	Course Outcome Statements
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

OPEN COURSE

PAPER CODE & NAME: PHY5D01(1): NON CONVENTIONAL ENERGY SOURCES

Cos	Course Outcome Statements
CO1	Understand the importance of non conventional energy sources
CO2	Understand basic aspects of solar energy
CO3	Understand basic principles of wind energy conversion
CO4	Understand the basic ideas of geothermal and biomass energy and recognize their merits and demerits
CO5	Understand the basic ideas of oceans and chemical energy resources and recognize their merits and demerits

COMPLEMENTARY COURSE OUTCOMES (COs) -THEORY

COMPLEMENTARY COURSE 1

PAPER CODE & NAME: PHY1C01: Properties of matter & Thermodynamics

COs	Course Outcome Statements
CO1	Understand the basic principles of elasticity
CO2	Understand the concepts of surface tension
CO3	Understand the aspects of viscosity
CO4	Understand the basic principles of thermodynamics

COMPLEMENTARY COURSE 2

PHY2C02: Optics, Laser & Electronics

COs	Course Outcome Statements
CO1	Understand the basic ideas of frames of reference and the principles of conservation of energy and momentum
CO2	Understand the concepts of relativity
CO3	Understand the basic ideas of oscillations and waves
CO4	Understand the basic ideas of modern physics

COMPLEMENTARY COURSE 3

PAPER CODE & NAME: PHY3C03: Mechanics, Relativity, Waves and Oscillations

COs	Course Outcome Statements
CO1	Understand the basic ideas of frames of reference and the principles of conservation of energy and momentum
CO2	Understand the concepts of relativity
CO3	Understand the basic ideas of oscillations and waves
CO4	Understand the basic ideas of modern physics

COMPLEMENTARY COURSE 4

PAPER CODE & NAME: PHY4C04: Electricity, Magnetism and Nuclear physics

COs	Course Outcome Statements
CO1	Understand the basic ideas of static and current electricity
CO2	Understand the concepts of magnetism
CO3	Describe the fundamental concepts ofnuclear physics
CO4	Understand the basic ideas of cosmic raysand elementary particles

COPLIMENTARY PRACTICAL

PAPER CODE & NAME: PHY4C05: PHYSICS PRACTICAL I

COs	Course Outcome Statements
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