

**Department Physics**  
**Programme Specific Outcomes**  
**AIMS AND OBJECTIVES OF B.Sc. PHYSICS**

The Department of Physics recognizes that curriculum, course content and assessment of scholastic achievement play complementary roles in shaping education. The department is of the view that assessment should support and encourage the goals such as basic knowledge of the discipline of Physics including phenomenology, theories and techniques, concepts and general principles. This should also support the ability to ask physical questions and to obtain solutions to physical questions by use of qualitative and quantitative reasoning and by experimental investigation. The important student attributes including appreciation of the physical world and the discipline of Physics, curiosity, creativity and reasoned skepticism and understanding links of Physics to other disciplines and to societal issues should give encouragement. With this in mind, we aim to provide a firm foundation in every aspect of Physics and to explain a broad spectrum of modern trends in physics and to develop experimental, computational and mathematical skills of students. The programme also aims to develop the following abilities:

PSO1: Read, understand and interpret physical information – verbal, mathematical and graphical.

PSO2: Equip students in methodology related to Physics.

PSO3: Impart skills required to gather information from resources and use them.

PSO4: To give need based education in physics of the highest quality at the undergraduate level.

PSO5: Provide an intellectually stimulating environment to develop skills and enthusiasms of students to the best of their potential.

PSO6: Use Information Communication Technology to gather knowledge at will.

PSO7: Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.

Department of Physics

**Course Outcomes**

**B. Sc. I, Semester I**

**Physics Paper I: DSC 1 A: Mechanics I**

After completing this course student will able to

CO1: Understand and recognize scalar and vector physical quantities.

CO2: Understand and able to apply the ordinary differential equations to physical Problems

CO3: Understand the Newton's laws of motion.

CO4: Understand the conservation of momentum and energy and related physical phenomenon.

CO5: Understand the rotational motion, moment of inertia and able to determine the M. I. of various systems in rotational motion.

**Physics Paper II: DSC 2 A: Mechanics II**

After completing this course student will able to

CO 1: Apply gravitational laws to a physical problem

CO2: recognize simple harmonic motions in nature and solve their equations

CO3: Understand Properties of matter (e.g. elasticity and surface tension) and apply this knowledge to physical problem.

## **B. Sc. I, Semester II**

### **Physics paper III                      DSC B: Electricity and Magnetism I**

C01: Prove and apply Gauss, Stokes and Greens theorems

C02: understand electrostatic field and potential and determine the same for different physical bodies.

C03: Capacitor and its types

C04: Energy in electrostatic field.

### **Physics Paper IV                      DSC 2B: Electricity and Magnetism II**

After completing this course student will

C01: Solve and build desired A. C. circuits

C02: Get knowledge of magnetic effect of electric current and different magnetic materials

C03: Understand how different energies will convert into electrical energy using magnetic field

C04: Able to understand Maxwell's equations and its applications.

## **B. Sc. II, Semester III**

### **Physics Paper V: DSC – C1 Thermal Physics and Statistical Mechanics - I**

After completing this course student will

- CO1: Understand kinetic interpretation of temperature, Andrew's Expt. and different types of thermometers
- CO2: Understand kinetic theory of gases and concept of Transport phenomena.
- CO3: Understand thermo-dynamical state, thermodynamic equilibrium, various thermodynamic processes and first law of thermodynamics.
- CO4: Understand second and third laws of thermodynamics, Carnot's theorem, working of Carnot's engine, Otto engine and diesel engine and concept of entropy.

### **Physics Paper VI: DSC – C2 Waves and Optics - I**

This course will enable Students to:

- CO1: Understand SHM and its solution, superposition principle and Lissajous figures and their uses.
- CO2: Understand travelling and standing waves on a string, plane waves and spherical waves.
- CO3: Understand define transducers and their types, to understand concept of acoustics of buildings, Sabine's experimental work and reverberation time.
- CO4: Understand the Piezo-electric effect, detection of Ultrasonic waves and applications of ultrasonic waves.

## **B. Sc. II, Semester VII**

### **Paper VII: DSC – C1 Thermal Physics and Statistical Mechanics - II**

This course will enable Students to:

CO1: To Learn measuring skills in practical.

CO2: understand the wave particle duality and its quantum mechanics.

CO3: To understand the length of vibrating air columns, Resonance and can measure velocity of sound.

CO4: To determine thermal conductivity, temperature coefficient of resistance, thermo-emf and specific heat.

## **B. Sc. II, Semester IV:**

### **Paper VII : DSC – C2 Waves and Optics - II**

This course will enable Students to:

CO1: To understand various thermo dynamical functions, Maxwell's Relations, Joule-Thompson effect and Clausius- Claperyon Equation.

CO2: To understand Black body radiation, Planck's law, Rayleigh-Jean's law, Stefan Boltzmann law and Wien's displacement law.

CO3: To understand Phase Space, Macrostate, Microstate, Ensembles, Priori Probability.

CO4: To understand thermodynamic Probability and Maxwell Boltzmann Distribution law.

## **B. Sc. III Semester V**

### **PAPER IX: MATHEMATICAL & STATISTICAL PHYSICS**

- CO 1: Students have understood micro and macro canonical ensembles, phase space, state.
- CO 2: Students can easily distinguish between Mathematical & Statistical Physics.
- CO 3: Improve the mathematical skills to solve to problems in physics.
- CO4: Students have understand different types of differential equations & their solutions.

### **PAPER X: QUANTUM MECHANICS**

- CO 1: Students understand the idea of wave function & uncertainty relations.
- CO 2: Students clear the some concepts of physics by quantum mechanics.
- CO 3: Students solve problems on barrier potential well, one and three dimensional potential well
- CO 4: To understand the Schrodinger's equation for hydrogen atom.

### **PAPER XI: CLASSICAL MECHANICS**

- CO 1: Students are able to understand the concept of force, constraints, Newton's laws of motions.
- CO 2: Formulation of Langrangian equation of motion and solution of problems.
- CO 3: Understand the difference between Classical & Quantum Mechanics.
- CO 4: Students are able to understand Euler's Theorem and its equation of motion.

## **PAPER XII: ATOMIC, MOLECULAR SPECTRA & ASTRONOMY AND ASTROPHYSICS**

CO 1: Develop a basic understanding of physics of atoms and molecules: definitions, units, laws and rules.

CO 2: Identify atomic effect such as Zeeman effect, Paschen-Back effect and Raman effect.

CO 3: Understanding of basic concepts of Astronomy & Astrophysics

CO 4: Analyze the spectra of diatomic molecules such as electronic, rotational, Vibration spectra.

### **B. SC. III SEM VI**

## **PAPER XIII: NUCLEAR AND PARTICLE PHYSICS**

CO 1: Students are able to understand the size of nucleus and all its properties.

CO 2: Students know various method of accelerating various types of particles.

CO 3: Understanding the construction & working of Nuclear Detectors.

CO 4: Students are able to understand the different Nuclear Energy Levels.

## **PAPER XV: ELECTRODYNAMICS & ELECTROMAGNETIC WAVES**

CO 1: Students know the basic concepts about Electrodynamics & Electromagnetic waves.

CO 2: Students are able to understand concept of Poission's & Laplace's equations and its Solutions.

CO 3: Understanding the various laws like Faraday's Law, Lenz's Law and Biot Savarot's Law.

CO 4: Students learn the basic Maxwell's equation and its physical significance.

#### **Paper XIV: Energy studies and Material Science**

After completing this course student will able to

C01: understand basics of renewable energy sources

C02: Understand Physics and mathematics of wind turbine generator.

C03: Understand conversion of solar energy into electric energy, photovoltaic cell, solar PV system and solar potentials.

C04: understand different types of disorder in the crystalline solids and it's important.

C05: gain basic knowledge of superconductivity.

#### **Paper XVI: Solid State Physics**

After completing this course student will able to

C01: develop a clear concept of the crystal classes and symmetries

C02: understand the relationship between the real and reciprocal space

C03: calculate the Braggs conditions for X-ray diffraction in crystals

C04: create understanding of electronic and vibrational properties of solid state systems

C05: Understand Band theory of solids and use in different physical phenomenon.

C06: Understand construction, working and applications of IC