

B.Sc in Physics

I to VI Semester Course Outcomes

I Semester (RNEP Scheme)

DSC-1: Mechanics and Properties of matter

Course Outcomes (COs):

After successful completion of the course, the student will be able to

CO1 : Learn about conservation laws in different frames of reference

CO2 : Know how g can be determined experimentally and derive satisfaction.

CO3 : Come to know how various elastic moduli can be determine.

CO4 : Measure surface tension and viscosity and appreciate the methods adopted.

II Semester

DSC-2: Thermal Physics and Electronics

Course Outcomes (COs):

After successful completion of the course, the student will

CO1: Know the vocabulary and concept of physics as it applies to Principal of Electric Field.

CO2: Apply Gauss's law of electrostatics to solve a variety of problems.

CO3: Describe the magnetic field produced by magnetic dipoles and electric currents.

CO4: Explain gradient, curl & divergence concepts and Maxwell laws to articulate the relationship between electric and magnetic fields.

III Semester (NEP Scheme)

DSC-3: Wave Motion and Optics

Course Outcomes (COs):

At the end of the course students will be able to:

CO1: Identify different types of waves by looking into their characteristics.

CO2: Formulate a wave equation and obtain the expression for different parameters associated with waves.

CO3: Explain and give a mathematical treatment of the superposition of waves under different conditions, such as, when they overlap linearly and perpendicularly with equal or different frequencies and equal or different phases.

CO4: Describe the formation of standing waves and how the energy is transferred along the standing wave in different applications, and mathematically model in the case of stretched string and vibration of a rod.

CO5: Give an analytical treatment of resonance in the case of open and closed pipes in general and Helmholtz resonators in particular.

CO6: Describe the different parameters that affect the acoustics in a building, measure it and control it.

CO7: Give the different models of light propagation and phenomenon associated and measure the parameters like the wavelength of light using experiments like Michelson interferometer, interference and thin films.

CO8: Explain diffraction due to different objects like single slit, two slits, diffraction of grating, oblique incidence, circular aperture and give the theory and experimental setup for the same.

CO9: Explain the polarization of light and obtain how the polarization occurs due to quarter wave plates, half wave plates, and through the optical activity of a medium.

IV Semester (NEP Scheme)

DSC-4: Thermal Physics and Electronics

Course Outcomes (COs):

At the end of the course students will be able to:

CO1: Apply the laws of thermodynamics and analyze the thermal system.

CO2: Apply the laws of kinetic theory and radiation laws to the ideal and practical thermodynamics systems through derived thermodynamic relations.

CO3: Use the concepts of semiconductors to describe different Semiconductor devices such as diode transistors, BJT, FET etc and explain their functioning.

CO4: Explain the functioning of OP-AMPS and use them as the building blocks of logic gates.

CO5: Give the use of logic gates using different theorems of Boolean Algebra followed by logic circuits.

V Semester (NEP Scheme)

DSC-5: Classical Mechanics and Quantum Mechanics- I

Course Outcomes (COs):

After the successful completion of the course, the student will be able to

CO1: Identify the failure of classical physics at the microscopic level.

CO2: Find the relationship between the normalization of a wave function and the ability to correctly calculate expectation values or probability densities.

CO3: Explain the minimum uncertainty of measuring both observables on any quantum state.

CO4: Describe the time-dependent and time-independent Schrödinger equation for simple potentials like for instance one-dimensional potential well and Harmonic oscillator.

CO5: Apply Hermitian operators, their eigen values and eigenvectors to find various commutation and uncertainty relations.

DSC-6: Elements of Atomic, Molecular & Laser Physics

Course Outcomes (COs):

After the completion of the course, the student will be able to

CO1: Describe atomic properties using basic atomic models.

CO2: Interpret atomic spectra of elements using vector atom model.

CO3: Interpret molecular spectra of compounds using basics of molecular physics.

CO4: Explain laser systems and their applications in various fields.

VI Semester (NEP Scheme)

DSC-7: Elements of Condensed Matter & Nuclear Physics

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- CO1:** Explain the basic properties of nucleus and get the idea of its inner information.
- CO2:** Understand the concepts of binding energy and binding energy per nucleon v/s mass number graph.
- CO3:** Describe the processes of alpha, beta and gamma decays based on well-established theories.
- CO4:** Explain the basic aspects of interaction of gamma radiation with matter by photoelectric effect, Compton scattering and pair production.
- CO5:** Explain the different nuclear radiation detectors such as ionization chamber, Geiger-Mueller counter etc.
- CO6:** Explain the basic concept of scintillation detectors, photo-multiplier tube and semiconductor detectors.

DSC-8: Electronic Instrumentation & Sensors

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- CO1:** Identify different types of tests and measuring instruments used in practice and understand their basic working principles.
- CO2:** Get hands on training in wiring a circuit, soldering, making a measurement using an electronic circuit used in instrumentation.
- CO3:** Have an understanding of the basic electronic components viz., resistors, capacitors, inductors, discrete and integrated circuits, colour codes, values and pin diagram, their practical use.
- CO4:** Understanding of the measurement of voltage, current, resistance value, identification of the terminals of a transistor and ICs.
- CO5:** Identify and understand the different types of transducers and sensors used in robust and hand-held instruments.
- CO6:** Understand and give a mathematical treatment of the working of rectifiers, filter, data converters and different types of transducers.

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CO7: Connect the concepts learnt in the course to their practical use in daily life.

CO8: Develop basic hands-on skills in the usage of oscilloscopes, multimeters, rectifiers, amplifiers, oscillators and high voltage probes, generators and digital meters.

CO9: Servicing of simple faults of domestic appliances: Iron box, immersion heater, fan, hot plate, battery charger, emergency lamp and the like.