

**Course: B. Sc. Physics**  
**Programme Outcomes:**

**Core Papers:**

**DSC1: Mechanics:** The students would learn about the behaviour of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life. The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.

**DSC1 LAB:** Students would perform basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements.

**DSC2: Electricity and Magnetism:** It gives an opportunity for the students to learn about one of the fundamental interactions of electricity and magnetism, both as separate phenomena and as a singular electromagnetic force. The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equations. The course is very useful for the students in almost every branch of science and engineering.

**DSC2 LAB:** Students would gain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc.

**DSC3: Thermal Physics and Statistical Mechanics:** The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation and statistical mechanics.

**DSC3 LAB:** Students would gain practical knowledge about heat and radiation, thermodynamics, thermo emf, RTD etc. and perform various experiments.

**DSC4: Wave and Optics:** The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering.

**DSC4 LAB:** The practical knowledge of wave motion doing experiments: Tuning fork, electric vibrations. They would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: Prism, grating, spectrometers

**Discipline Specific Elective papers(any two):**

**DSE1: Elements of Modern Physics:** Students would know about the basic principles in the development of modern physics. The topics covered in the course build a basic foundation of undergraduate physics students to study the advance branches: quantum physics, nuclear physics, particle physics and high energy physics. The course contains the study of Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations, and brief idea of nuclear physics.

**DSE1 LAB-Elements of Modern Physics:** In this course students would be able to understand Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of H-spectrum, Single and double slit diffraction, Photo electric effect and determination of  $e/m$

**DSE1: Solid State Physics:** Students would be able to understand various types of crystal structures and symmetries and understand the relationship between the real and reciprocal space and learn the Bragg's X-ray diffraction in crystals. Would also learn about phonons and lattice.

**DSE1 LAB- Solid State Physics:** The course Provides practical knowledge of various physical phenomena such as: magnetism, dielectrics, ferroelectrics and semiconductors. Students would gain a hands-on learning experience by performing experiments on these properties of materials.

**DSE2: Quantum Mechanics:** Quantum mechanics provides a platform for the physicists to describe the behaviour of matter and energy at atomic and subatomic level. The course plays a fundamental role in explaining how things happen beyond our normal observations. The course includes the study of Schrodinger equations, particle in one dimension potential, quantum theory of H like atoms, atoms/molecules in electric and magnetic fields.

**DSE2 LAB- Quantum Mechanics:** Various practical problems solving methods related to Quantum Mechanics would be learned by students.

**DSE2: Mathematical Physics:** Would learn mathematical methods to solve the various problems in physics. The topics include the calculus of functions, Fourier transform, special functions and special integrals, partial differential equations, complex analysis and variables.

**DSE2 LAB- Mathematical Physics:** Various practical problems related to applications of mathematical tools to solve the problems in physics would be learned by students

### **Skill Enhancement Courses (any two):**

**SEC1 - Electronics –I:** The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics.

**SEC2- Computational Physics:** This course would introduce students with the basic knowledge of computers their applications in solving common and scientific problems, the course include scientific programming languages, scientific word processing and graphical analysis.

**SEC3-Electronics II:** Students would learn about electronic circuits such as Amplifiers and Oscillators. Various types of Amplifier and Oscillator circuits their working and applications in in domestic, industrial and scientific devices/equipments.

**SEC4: Radiation and Safety:** The students would gain the knowledge of different types of radiation and its interactions with matter, would also know about the photons, charged particles, neutrons, about radiation detection, monitoring and safety measures, and also learn about the applications of nuclear techniques.

### **B. Sc. PHYSICS**

**PROGRAMME SPECIFIC OUTCOMES:** This undergraduate course in Physics Would provide the opportunity to the students:

- To understand the basic laws and explore the fundamental concepts of physics
- To understand the concepts and significance of the various physical phenomena.
- To carry out experiments to understand the laws and concepts of Physics.
- To apply the theories learnt and the skills acquired to solve real time problems.
- To acquire a wide range of problem solving skills, both analytical and technical and to apply them.
- To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
- To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community.
- To motivate the students to pursue PG courses in reputed institutions.
- This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements.
- Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.