## B.Sc. Physics Semester-I (Mechanics)

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| **Paper -1Mechanics** | • After going through the course, the student should be able to understand laws of motion and their application to various dynamical situations, concept of impact parameter and Rutherford's scattering notion of inertial frames and concept of Galilean invariance.<br>• He / she will learn the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.<br>• Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions.<br>• Understand the phenomena of collisions and idea about centre of mass and laboratory frames and their correlation.<br>• Understand the principles of elasticity through the study of Young Modulus and modulus of rigidity.<br>• Apply Kepler's law to describe the motion of planets and satellite in circular orbit, through the study of law of Gravitation.<br>• Describe special relativistic effects and their effects on the mass and energy of a moving object.<br>• appreciate the features of Special Theory of Relativity (STR) |

**B.Sc. Physics Semester-II (Waves and Oscillations)**

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| **Paper -2 Waves and Oscillations** | • To understand the measurement of 'g' using compound pendulum.<br>• He / she will learn about the combination of S.H.M. waves and the Lissajou's figures.<br>• He/she will able to distinguish between damped and forced oscillations<br>• Understand the terms logarithmic decrement and time relaxation.<br>• Knows the relation between the resonances.<br>• Understand about the Fourier theorem the coefficients and its applications.<br>• Able to understand about the transversal waves of a stretched string<br>• Knows about the longitudinal waves in a bar.<br>Understand the production detection and application of Ultrasonics. |

## B.Sc. Physics Semester-III (Wave Optics)

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| Paper -3 **Wave Optics** | • Understand the concept of various types of aberrations and corrections.<br>• Understand the principle of superposition of waves, so thus describe the formation of standing waves.<br>• Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.<br>• Understand the working of selected optical instruments like bi prism, interferometer, diffraction grating, and holograms.<br>• Understand about the polarization of light and optical activity.<br>• Understand the spontaneous and stimulated emission of radiation, optical pumping and population inversion. Ruby laser and He-Ne laser in details. Basic lasing.<br>• Understand the principle of optical fibres in telecommunications.<br>• In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand Lissajous figures and behaviour of transverse, longitudinal waves. |

**B.Sc. Physics Semester-IV (Thermo dynamics)**

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| **Paper -4 Thermodynamics** | ➢ Comprehend the basic concepts of thermodynamics, the first and the second laws of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.<br>➢ Learn about Maxwell's thermodynamic relations.<br>➢ Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion.<br>➢ Learn about the real gas equations, Vander Waal equation of state, Joule-Thomson effect.<br>➢ Understand about the production of low temperatures.<br>➢ Understand about the black body radiation and its equations and solar constant. |

## B.Sc. Physics Semester-V (ELECTRCITY AND MAGNETISM)

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| **Paper -5**<br>**Electricity and magnetism** | • Course learning outcome: After going through the course, the student should be able to Demonstrate Gauss law, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.<br>• Explain and differentiate the vector (electric fields) and scalar (electric• potential, electric potential energy)<br>• Apply Gauss's law of electrostatics to solve a variety of problems.<br>• Explain Biot-Savart's law Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields. Understand the dielectric properties and the phenomena of electromagnetic induction.<br>• Describe how magnetism is produced and list examples where its effects are observed.<br>• Apply Kirchhoff's rules to analyze AC circuits consisting of parallel and/or series<br>• combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor. Electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments.<br>• Achieve an understanding of the Maxwell's equations, role of displacement current.<br>• Basic electronics operations of diodes and transistors and their applications.<br>• Fundamentals of digital electronics and logic gates. |

**B.Sc. Physics Semester-V (Modern physics)**

| Course | Out comes<br><br>After completion of the course the student will gain knowledge in |
|---|---|
| **Paper -6 Modern physics** | • Know main aspects of the atomic models and their experimental verification.<br>• Study of influence of magnetic field on atoms will help in understanding Zeeman Effect respectively. L-S and J-J couplings. Understand about the Raman Effect.<br>• To discuss and interpret experiments that reveals the dual nature of matter and Heisenberg's uncertainty principle.<br>• Understand the theory of quantum measurements, wave packets.<br>• Understand the central concepts of quantum mechanics: wave functions, momentum and energy operator, the Schrodinger equation, time dependent and time independent cases, probability density and the normalization techniques,<br>• Understanding the properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus.<br>• Know about the nuclear models and their roles in explaining the ground state properties of the nucleus –(i) the liquid drop model, its justification so far as the nuclear properties are concerned, (ii) the shell model, evidence of shell structure, magic numbers,.<br>• Learn about the process of radioactivity, the radioactive decay law, the emission of alpha, beta and gamma rays, the properties of the constituents of these rays, Gamow's theory of alpha decay , beta decay with the neutrino hypothesis, the electron capture, the Geiger-Nuttal law, the radioactive series.<br>• A brief idea about crystalline and amorphous substances, about lattice, |

| | |
|---|---|
| | unit cell, miller indices, reciprocal lattice, concept of diffraction of X-rays by crystalline materials. Understanding above the band theory of solids and must be able to differentiate insulators, conductors and semiconductors. Understand the basic idea about superconductors and their classifications. |