**Departments - PHYSICS - Course Outcomes**

  DEPARTMENT OF PHYSICS   
The Outcomes of UG Course, B. Sc. in Physics   
After completion of B. Sc. in Physics students are able to:

* Demonstrate a rigorous understanding of the core theories & principles of physics, which includes mechanics, electromagnetism, thermodynamics, & quantum mechanics.
* Learn the Concepts as Quantum Mechanics, Relativity, introduced at degree level in order to understand nature at atomic levels.
* Provide knowledge about material properties and its application for developing technology to ease the problems related to the society.
* Understand the set of physical laws, describing the motion of bodies, under the influence of system of forces.
* Understand the relationship between particles & atom, as well as their creation & decay.
* Relate the structure of atoms & subatomic particles
* Understand physical properties of molecule the chemical bonds between atom as well as molecular dynamics.
* Analyze the applications of mathematics to the problems in physics & develop suitable mathematical method for such application & for formulation of physical theories.
* Learn the structure of solid materials & their different physical properties along with metallurgy, cryogenics, electronics, & material science.
* Understand the fundamental theory of nature at small scale & levels of atom & sub-atomic particle.

P-III: ELECTRCITY AND MAGNETISM (Credits: 07, Theory-04, Practicals-03)

**Course learning outcome**: After going through the course, the student should be able to Demonstrate

* Gauss law, Coulomb’s law for the electric field, Demonstrate Gauss law, Coulomb’s law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.
* Explain and differentiate the vector (electric fields, Coulomb’s law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.  Apply Gauss’s law of electrostatics to solve a variety of problems.
* Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.  Demonstrate a working understanding of capacitors.
* Describe the magnetic field produced by magnetic dipoles and electric currents.
* Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields.  Understand the dielectric properties, magnetic properties of materials and the phenomena of electromagnetic induction.  Describe how magnetism is produced and list examples where its effects are observed.
* Apply Kirchhoff’s rules to analyze AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.
* Apply various network theorems such as Superposition, Thevenin, Norton, Reciprocity, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.
* In the laboratory course the student will get an opportunity to verify various laws in electricity and magnetism such as Lenz’s law, Faraday’s law and learn about the construction, working of various measuring instruments.
* Should be able to verify of various circuit laws, network theorems elaborated above using simple electric circuits.
* (X) **Skills to be learned**: This course will help in understanding basic concepts of electricity and magnetism and their applications.  Basic course in electrostatics will equips the student with required prerequisites to understand electrodynamics phenomena.

P-IV: WAVES AND OPTICS

**(Credits: 07, Theory-04, Practicals-03)**

**Course learning outcome**: This course will enable the student to

1. Recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.
2. Apply basic knowledge of principles and theories about the behaviour of light and the         physical environment to conduct experiments.
3. Understand the principle of superposition of waves, so thus describe the formation of standing waves.
4. Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.
5. Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.  Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms.
6. 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.
7. Resolving power of optical equipment can be learnt firsthand.