

## **PHYSICS**

### **Programme specific out comes**

After completing the programme students are expected to

- Acquire the knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Botany, etc.
- Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments
- Acquire the skills of observations and drawing logical inferences from the scientific experiments.
- Analyze the given scientific data critically and systematically and the ability to draw the objective conclusions.
- Realize the developments in any science subject helps in the development of other science subjects and vice-versa and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
- Develop scientific outlook not only with respect to science subjects but also in all aspects related to life.
- Realize knowledge of subjects in influence which inspires in evolving new scientific theories and invention
- Understand basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.

## DEPARTMENT OF PHYSICS

### **The Outcomes of UG Course, B. Sc. in Physics**

At the completion of B. Sc. in Physics students are able to:

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

Department Of Physics

**Learning Objective & Outcomes B.Sc.1st Semester Subject:**

**MECHANICS AND PROPERTIES OF MATER**

Subject Code: PHY: 101

**Learning Objective**

1. The students will introduce about the forces, angular momentum and knowledge about the Constraint.
2. The course will give knowledge about the general parameter like velocity, acceleration.
3. The course provides the students about the knowledge of M.I.
4. The course provides the students about the knowledge of hollow cylinder and solid cylinder.

**Learning Outcomes**

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

1. Get the knowledge about forces helps the students in their daily life.
2. The velocity and acceleration parameter give the knowledge about how the vehicles Move.
3. The information will teach the students about the rolling concept

Department of Physics

Learning Objective & Outcomes B.Sc. 1st Semester

**Subject: Electricity and Magnetism**

Subject Code: PHY102

**Learning Objective**

1. This paper deals with the study of Electric field, Magnetic field, and Electromagnetic theory.
2. The first unit gives the mathematical idea behind the electrostatic field.
3. The second unit deals with the physics behind the Magneto statistics.
4. Last unit deals with the electromagnetic theory.

**Learning Outcomes**

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

1. Explain various phenomenon like Ferromagnetism, ant ferromagnetism etc.
2. Understand the relation in between Electromagnetic theory.
3. Explain various phenomenons in light of Maxwell equations.

**Department of Physics 2017-18 (Even)**

Learning Objective & Outcomes B.Sc. 2nd Sem.

**Subject: Properties of Matter, Kinetic Theory and Relativity** Subject code: PHY-201

**Learning Objective**

This Course Enables the Student

1. To describe the concept of stress/strain and in its relation to force/displacement
2. To know the effect of forces during static conditions.
3. To determine axial forces, shear forces and bending moments
4. To express the relationship between the pressure and the average kinetic energy of gas molecules in the form of equation
5. To express the five basic assumptions of the Kinetic Molecular Theory of Gases.
6. To introduce students to the concept of special relativity and its applications to Physical Sciences

Learning Outcomes upon successful completion of this course it is intended that a student will be able to:

1. Students will be able to identify the type of force, type of supports and the reactions on beams and plane frames.
2. The students shall be familiar with the fundamental principles of the general theory of relativity. They shall know the meaning of basic concepts like the equivalence principles, inertial frames and time dilation
3. Establish the non-existence of the hypothesized stationary aether through the null result of Michelson-Morley experiments with interferometer.
4. Explain the true nature of Newtonian mechanics and Lorentz Transformation equations.
5. Understand the concept of constant relative motion of different bodies in different frames of references

**Department of PHYSICS 2017-18(Even)**

Learning Objective & Outcomes B.Sc. 2nd Semester

**Subject: Electromagnetic Induction & Electronic Devices Subject Code: PHY-202**

**Learning Objective**

1. The objective of the course is to appraise the students about the electronics industry.
2. To learn about the electronic component like Diode, transistor etc.
3. Structural analysis about the e component.
4. Knowledge about resistance inductor and capacitor.

**Learning Outcomes**

After the completion of the course, Students will be able to:

1. Students shall learn about the significance of electric components.
2. Significance of various devices and how they will operate.
3. It will teach the students about the circuit connection.
4. About the graphical relationship of resistance, capacitor and inductor.

**Department of Physics 2017-18**

Learning Objective & Outcomes B.Sc. 3rd Semester

Subject: Optics

Subject Code: PHY-302

Learning Objective

1. The main objective of this subject is to aware the students about various phenomenon of waves and optics.
2. First unit of deals with the Fourier analysis and Fourier transformation.
3. The second deals with the matrix method in order to explain various phenomenons.
4. The third unit describes the Phenomenon like interference phenomenon.

**Learning Outcomes**

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

1. Understand the physics behind various phenomenons in wave and optics.
2. Understand various phenomenons and the cause or origin of them.
3. Explain the relationship in between various optical phenomenons with the Fourier series and matrix.

**Subject: Statistical Mechanics**

**Learning objectives**

1. This course in statistical mechanics provides the basic idea of probability to the students. There are ways of calculating probability for various statistical systems of particles.
2. Students will study basic ideology of phase space, microstate, and macrostate.
3. The objective is to apply the principles of probability in distribution of particles in various systems and to calculate thermodynamic probability.
4. The course gives the insight of postulates of statistical physics.
5. Students will learn the different types of statistics distribution and particles. They will learn which particles follow which statistics and why.
6. The aim is to apply this statistical distribution in real life problems and understand their problems.
7. Many real system of particles will be dealt throughout the course to relate the theoretical knowledge to practical one.

**Learning outcomes**

1. After taking this course students are able to determine the probability of any type of events. They are able to interpret different types of events.
2. Students have understood the concept of phase space and its volume.
3. They can easily distinguish between different types of particles and statistics and can easily distribute bosons, fermions and classical particles among energy levels.
4. After studying Fermi Dirac statistics, students have learnt to deal with much electron system in real life.



Department of Physics

Learning Objective & Outcomes B.Sc. 5th Semester

**Subject: Solid State Physics**

Learning Objective This Course Enables the Student to

1. Describe the difference between crystalline and amorphous materials.
2. Describe the arrangement of atoms and ions in crystalline structures
3. Schematically diagram face-centered cubic, body-centered cubic and hexagonal closepacked unit cells.
4. Recognize and also give the lattice parameter relationships for all seven crystal systems--i.e., cubic, hexagonal, tetragonal, rhombohedral, orthorhombic, monoclinic, and triclinic.
5. Given a unit cell and the Miller indices for a plane, draw the plane represented by these indices referenced to this unit cell.
6. Given the unit cell for some crystal structure, be able to draw the atomic packing arrangement for a specific crystallographic plane.
7. Explain the use of X-ray diffraction measurements in determining crystalline structures

Learning Outcomes upon successful completion of this course it is intended that a student will be able to:

1. Demonstrate an understanding of the crystal lattice and how the main lattice types are described
2. Formulate the theory of X-ray diffraction in the reciprocal lattice (k-space) formalism and apply this knowledge to generalize the formulation for matter waves
3. be able to perform structure determination of simple structures
4. Learn that Dulong-Petit Law is valid only at high temperature.
5. Learn that lattice specific heat of solid vary  $T^3$  at very low temperat

Department of Physics

Learning Objective & Outcomes B.Sc. 5th Semester

**Subject: Quantum mechanics**

**Learning Objective**

1. To study the basic principles of quantum mechanics.
2. Explain the operator formulation of quantum mechanics.
3. Student learns the concept of wave function.
4. Student will learn Schrodinger equation and their applications.
5. To study role of uncertainty in quantum physics.

**Learning Outcomes**

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

1. Pinpoint the historical aspects of development of quantum mechanics.
2. Understand and explain the differences between classical and quantum mechanics.
3. Understand the idea of wave function.
4. Understand the uncertainty relations.
5. Solve Schrodinger equation for simple potentials.

Learning Objective & Outcomes B.Sc.(Physics) 6th Semester

**Subject : Atomic, Molecular and Laser Physics**

**Learning Objective**

1. Describe the atomic spectra of one and two valence electron atoms.
2. Explain the change in behaviour of atoms in external applied electric and magnetic field.
3. Explain rotational, vibrational, electronic and Raman spectra of molecules.
4. Describe electron spin and nuclear magnetic resonance spectroscopy and their applications.
5. Basic Laser principles, Laser behaviour, Properties of laser radiations, Different types of Lasers and Laser applications

**Learning Outcomes**

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

1. Describe theories explaining the structure of atoms and the origin of the observed spectra.
2. Identify atomic effect such as Zeeman effect and Stark effect.
3. List different types of atomic spectra.
4. Explain the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.
5. Explain different Laser used and make a comparison between them.