

## DEPARTMENT OF PHYSICS

### COURSE OUTCOMES:

Students will be able to understand and apply the concepts of scalar and vector fields, calculate the gradient of a scalar field, determine the divergence and curl of a vector field.

Students will be able to apply the laws of motion, solve equations of motion for variable mass systems

Students will be able to define a rigid body and comprehend rotational kinematic relations, derive equations of motion for rotating bodies, analyze the precession of a top and gyroscope, understand the precession of the equinoxes

Students will be able to define central forces and provide examples, understand the characteristics and conservative nature of central forces, derive equations of motion under central forces.

Students will be able to differentiate between Galilean relativity and the concept of absolute frames, comprehend the postulates of the special theory of relativity, apply Lorentz transformations, understand and solve problems

Explain about the different aberrations in lenses and discuss the methods of minimizing them

Understand the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.

Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating and to describe the construction and working of zone plate and make the comparison of zone plate with convex lens

Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity.

Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields. To understand the basic principles of fibre optic communication and explore the field of Holography and Nonlinear optics and their applications.

Mastery of experimental techniques: Students should become proficient in using laboratory equipment and experimental techniques for studying light and its interactions with matter.

Application of theory to practice: Students should be able to apply theoretical concepts learned in lectures to real-world situations, and understand the limitations of theoretical models.

Accurate recording and analysis of data: Students should be able to accurately record and analyze experimental data, including understanding the significance of error analysis and statistical methods.

Critical thinking and problem solving: Students should be able to identify sources of error, troubleshoot experimental problems, and develop critical thinking skills in experimental design and analysis.

Understanding of physical principles: Students should develop an understanding of the physical principles governing optics, including reflection, refraction, diffraction, interference, and polarization. Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.

To learn the methods used to solve problems using loop analysis, Nodal analysis, Thvenin's theorem, Norton's theorem, and the Superposition theorem

Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.

Understand Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.

Develop an understanding on the unification of electric, and magnetic fields and Maxwell's equations governing electromagnetic waves.

Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor and the comparative study of series and parallel resonant circuits

Understand the principles of atomic structure and spectroscopy.

Understand the principles of molecular structure and spectroscopy

Develop critical understanding of concept of Matter waves and Uncertainty principle.

Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.

Increase the awareness and appreciation of superconductors and their practical applications