Course Outcomes:

Year I

Course: Mechanics and Special Relativity Theory

CO1: The students will be able to explain about vector calculus.

CO2: Frame of references and motion under a central force.

CO3: They will also be able to understand the mechanics of particles, non-rigid bodies and fluid.

CO4: Examples of surface tension in nature and its applications in our day-to-day life

CO5: Concept of viscosity of fluids, Bernoulli's Equation and its applications.

Course: Thermal Physics

CO1: The students will be able to learn about different types of thermodynamic processes.

CO2: The understanding of and interrelation between heat, work, and temperature.

CO3: Learn about the Carnot engine and refrigerator and their efficiency.

CO4: The concept of entropy and phase transition will also be known to the students.

CO5: Understanding of kinetic theory of gases and transport phenomena.

CO6: The students will know about the conduction and radiation of heat and will be able to estimate the temperature of Sun with help of solar constant.

Course: Electrical Circuit and Basic Semiconductor Electronics

CO1: Students will learn the electrical components like resistance, types of capacitors, and inductance and their behavior.

CO2: learn the working mechanism of Transformer, alternating current.

CO3: learn the current detection device Galvanometer, structure, and its functioning for steady and transient current.

CO4: They will also learn the behavior (I-V characteristics of diode and Zener diode) and use of Zener diode for regulator, application of diode as half wave and full wave rectifier, its efficiency, rectification constant, transistor and amplifiers.

CO5: The students will also learn the use of modulation for radio communication.

Course: Physics Practical (Mechanics, Electrical and Thermal Physics)

Course Outcome: On completion of this course, students will be able to learn and use different mechanical and electrical equipment as experiments.

Year II

Course: Optics

CO1: The students will be able to have clear understanding about different Cardinal points, lens systems and aberrations.

CO2: learn about different types of eyepieces in geometrical optics, construction and working of simple microscope.

CO3: Students will learn about interference, diffraction, formation of fringes.

CO4: The students will understand different aspects and types of Lasers and their applications.

CO5: Concept of Polarization, Double refraction, Construction and working of Nicol Prism

Course: Oscillations, Waves and Electromagnetism

CO1: Students will be able to understand the difference between oscillations and vibration, concept of wave and solution to the wave equation.

CO2: They will also be able to describe the velocity of waves in media such as fluid and string, acoustic and characteristic impedances of media, types of waves and will learn the concepts of Specific Acoustic Impedance of fluids and Characteristic Impedance of strings, concept of standing wave and theoretical description standing wave solutions.

CO3: Students will learn the laws of Electrostatics in Free Space such as Coulomb Law and Gauss Flux Law, concept of electric Field and electric Dipole, concept of Polarization, laws of Electrostatics in Dielectrics as Gauss Flux Law

CO4: laws of magnetostatics such as Ampere's Law and Biot Savart's Law, concepts of Vector potential, Divergence and Curl of B, concepts of Magnetic Moment, types of Magnetic Materials and Magnetization, concept of displacement Current.

CO5: Faraday's Law, Self and Mutual Inductances, Physical significance of Maxwell Equations, Plane polarized Plane Wave solution and characteristics of electromagnetic waves.

Course: Atomic and Nuclear Physics

CO1: The students will be able to learn atomic models and origin of spectra, X rays and Moseley law.

CO2: The students will understand the vector atom model and related Quantum numbers. The concept of wave particle duality, de-Broglie wave will be known to students.

CO3: They will be able to write and solve Schrodinger equations for particle in a box, potential step problems. The students will also know about quantum tunneling.

CO4: The fundamentals of nuclear physics and different nuclear models along with Radioactive decays and nuclear detectors such as Gieger-Muller Counter, Scintillation detectors. Nuclear models will help to understand the behavior of nuclei.

CO5: Study of compound nucleus will provide an understanding of nuclear fission and fusion of nuclei.

CO6: By studying different decay modes and nuclear detectors students may utilize the nuclear techniques in medical and industry.

Course: Practical (Optics, and Electricals)

CO1: On completion of this course, students will be able to learn and use the different optical and electrical equipment as experiments. The students will also be able to work effectively and safely in the laboratory environment independently.

Year III

Course: Quantum Mechanics

CO1: The student will understand the historical aspects of developments of quantum mechanics and can explain the differences between classical and quantum mechanics.

CO2: Quantum Mechanics provides a platform for the students to describe the behavior of matter and energy at atomic or subatomic level.

CO3: The course includes the study of de Broglie hypothesis, Heisenberg uncertainty relation and its application, Physical interpretation of wave function.

CO4: Schrodinger equation (time dependent and independent), potential problems in one dimension (particle in a box, rectangular potential barrier, tunnel effect, step potential, square potential well finite depth),

CO5: learn the harmonic oscillator, Hydrogen like atoms, Pauli spin matrices, Time independent perturbation theory etc. Various problems related to quantum mechanics would be learned by the students.

Course: Statistical Mechanics and Solid State Physics

CO1: In this Course, students will learn elementary concepts of Lagrangian and Hamiltonian equations of motion, basic ideas about phase space and ensembles.

CO2: The students can solve problems related to the ideal gas and harmonic oscillator in the micro canonical, canonical, and grand canonical ensemble and principle of equipartition of the energy, Maxwell's velocity distribution.

CO3: The course proceeded with introducing the quantum concept in the grand canonical ensemble for quantum particles including Bose-Einstein and Fermi-Dirac distributions with Simple applications (Black - body radiation and Electronic specific heat).

CO4: The students will learn Crystalline amorphous and glassy state of solids, Lattice translation vector, Crystal lattices, Primitive lattice cell, Miller indices, interplanar spacing, Bravais lattices, Crystal structures.

CO5: The students will be able to understand Brillouin Diffraction conditions in reciprocal lattice, Bragg's law, Vander Waals-London interaction, Lattice energy of ionic crystals,

Madelung constant, Cohesive energy, Lattice specific heat, Einstein and Debye models.

Course: Basic Digital Electronics and Photonic Devices

CO1: Fundamental of diode, bipolar junction transistor and their characteristics

CO2: Fabrication of field effect transistor, and its behavior

CO3: Application of BJT as logic gates e.g. NAND, NOR, Ex-OR using DTL, TTL and RTL.

CO4: Students will learn Boolean Algebra, SOP and POS form of logical expression and also simplification of logical expression with the help of Boolean algebra and Karnough Map.

CO5: Students will also learn the fundamentals of fabrication of Integrated circuits and photonic devices (LED, Solar Cell).

Course: Electromagnetic Theory, Laser, Holography and Optical Instruments

CO1: The students will be able to write the Laplace equation and its solution in Cartesian, Spherical and Polar coordinates.

CO2: They will Learn about Pointing theorem and Maxwell equations for source free space and dielectric media and its solution. The students will also understand dispersion.

CO3: On successful of the course, the students will be able to explain the basic concepts of different optical instruments and describe the working of optical components in various instruments.

CO4: They will be able to know the application of Laser and holograms in various fields.

Course: Practical

CO1: Students would gain practical knowledge by performing various experiments of Electronics, Optics and Laser.