Course outcome (Dept. of Physics)

Core 1 MATHEMATICAL METHOD-I

CO1: Learn and understand calculus. Starting with review of differentiation, exponential and logarithm functions, trigonometric functions, plotting functions, differentials and basics of integration.
CO2: Understand differential equations i.e. Homogenous and non homogenous first order DEs, second ODEs with constant and variable coefficients, Lagrange multipliers and Jacobins, Taylor series and their applications in physics.
CO3: Understand basics of vector calculus.
CO4: Understand divergence, gradient and curl and their physical interpretation.
CO5: Understand basics of Direct Delta function and its uses in physics

CO6: Understand divergence theorem, Green's theorem, Stokes 'theorem and appreciate its applications.

Core 2 Mechanics

CO1: Understand the dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, parallel axis theorem, the motion of rigid bodies. non-inertial frames: pseudo forces, examples involving the centrifugal force and Coriolis force.

CO2: Understand the basics of material properties like, elasticity, elastic constants and their relation, torsion of a cylinder, bending of a beam, cantilever, beam supported at its ends and loaded in the middle.

CO3: Understand the basics of motion of fluid which includes streamlined and turbulent flows, equation of continuity, critical velocity, flow of a liquid through a capillary tube, capillaries in series and parallel, Stokes 'formula.

CO4: To understand Oscilations i.e SHMs and its properties.

CO5: Develop understanding of special theory of relativity and its applications to understand length contraction, time dilation, relativistic addition of velocities, conservation of mass and energy.

Core 3 Electricity Magnetism.

CO1: Understand the basic concepts of electric fields, force, potentials, energy and how to approach the different solutions.Understand the concept of conductors, dielectrics, inductance and capacitance.

CO2: Understand the concept of magnetic fields, force, laws and its applications conductors, dielectrics, inductance and capacitance.
CO3:To understand various dielectric and magnetic properties of materials.Gain knowledge on electromagnetic induction and its applications.
CO4: To understand the electrical circuits such as AC, DC, LCR,LR,RC etc. To become familiar with network theorems and its applications

Core 4 Wave Optics

CO1:Understand type of waves and their propagation, superposition in different cases.
CO2: Use Lissajous figures to understand simple harmonic vibrations of same frequency and different frequencies.
CO3: To understand phenomenons based on light.
CO4: to gain knowledge about different types of interference and diffractions with the conditions.

Core 5 Mathematical Physics II

CO1: Understanding periodic and non periodic functions, expansion of functions in Fourier series, even and odd functions and their Fourier expansions and applications.
CO2: To solve the differential equation of variable coefficients using Frobenius method and its application to solve the special differential equations such as Legendre, Hermite, associated Legendre etc.
CO3: To understand the polynomials ,recurrence relations involving the special functions. Beta, Gamma factions and their correlation.
CO4: To solve the partial differential equations, Laplace's equations and its applications in physics.

Core 6 Thermal Physics

CO1: Understanding the Zeroth and first law of thermodynamics. Studying second law of thermodynamics, reversible and irreversible process with examples. Concepts of entropy and Carnots cycles and its applications.
CO2: Understanding thermodynamic potentials, enthalpy, Helmholtz free energy, Gibb's free energy and phase transitions relating to physical systems. Maxwell relations and its applications.
CO3: Understanding the kinetic theory of gases.Maxwell's law of distribution of velocities, mean free path, transport phenomena and learn to solve the problems. Molecular collisions. Transport phenomenon in ideal gases.

CO4: Understanding the behaviour of real gases,Van der Waals Equation of State for Real Gases,Comparison with Experimental Curves,Thomson effect.

Core 7 Analog Systems and applications.

CO1:Students will be able to understand about the physics of semiconductor p-n junction and devices such as rectifier diodes, zener diode, photodiode etc.
CO2: Understanding about bipolar junction transistors, transistor biasing and stabilization circuits, the concept of feedback in amplifiers and the oscillator circuits, students will also have an understanding of operational amplifiers and their applications.

Core 8 Mathematical physics III

CO1: Understanding complex numbers, variables, analyticity and CR equations, integration of complex variables,Cauchy's integration formula and its applications,Taylor's expansions.
CO2: Students will able to understand the integral transforms such as Fourier transforms and Laplace transforms and their properties and applications and able to learn their applications in physics.

Core 9 Elements of modern physics.
CO1: Students will be able to understand the development of modern physics and dual nature of radiation from Planck's law, Photoelectric effect, Compton's effect. Understanding the atomic spectra and atomic model.
CO2: Understanding the wave particle duality, De Broglie hypothesis, uncertainty principle.
CO3: Understanding the size and structure of atomic nucleus, nuclear force, NZ graph, Nuclear models.
CO4: Understanding radioactivity, alpha decay, beta decay, gamma ray, fission and fusion nuclear reactor.

Core 10 Digital systems and application.

CO1: Qualitative understanding of integrated circuits, digital circuits, gates.
CO2: Understand boolean algebra , karnaugh map, functioning of CRO and its applications.

CO3: Understanding basic ideas of data processing circuits , arithmetic circuits and timers.
CO4: Basic idea of computer organization, flip flops, shift registers, counters.

Core 11 Quantum mechanics and applications.

CO1: On successful completion of the course students will be able to understand the principles in quantum mechanics, such as the Schrödinger equation, the wave function, the uncertainty principle, stationary and non-stationary states, time evolution of solutions, as well as the relation between quantum mechanics and linear algebra.
CO2: students will eb able to understand the operators in quantum mechanics and its applications, expectation values, orthonormality, eigenfunctions and Eigen values.
CO3:Students learn about General discussion of bound states in an arbitrary potential-continuity of wave function, boundary condition and emergence of discrete energy levels; application to one- dimensional problem- square well potential; Quantum mechanics of simple harmonic oscillator-energy levels and energy eigenfunctions using Frobenius method.
CO4:Students will have the concepts of angular momentum and spin, as well as the rules for quantization and addition of these, spin-orbit coupling and Zeeman Effect.

Core 12 Solid state Physics.

CO1:Students should be able to explain the main features of crystal lattices and phonons, understand the elementary lattice dynamics and its influence on the properties of materials.
CO2: Understanding the lattice dynamics, phonons, magnetic properties of matters, curies law,Hysteresis curve etc.
CO3:Students will get a broad knowledge about the dielectric properties matters, Lasers and its types.
CO4: Understanding the band theory and superconductivity and its properties and applications.

Core 13 Electromagnetic theory

On successful completion of the course students will acquire the concepts of Maxwell's equations, propagation of electromagnetic (EM) waves in different homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information of polarising crystals, phase reatardation plates and optical rotations.

Core 14 Statistical Mechanics

On successful completion of the course students will be learn the techniques of Statistical Mechanics to apply in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics, Chemistry and in many other directions.

DSE1 Classical mechanics

CO1: Students will have the understanding of the Lagrangian and equation of motion of a system and its applications.

CO2: Understanding the Hamiltonian principle, Hamiltonian equation of motion and its applications .By the end of this course, students will be able to solve the seen or unseen problems, numericals in classical mechanics.

CO3: Special theory of relativity, Lorentz transformations, minkowski space, light cone four vector approach.

DSE2 Nuclear and particle physics.

CO1:Upon completion of this course, students will have the understanding of the qualitative and quantitative properties of nuclei, radioactive decays.

CO2: An understanding of different nuclear models, nuclear radiation detectors and particle accelerators.

CO3:students will have the understanding of the sub atomic particles and their properties, symmetric and conservation laws.

DSE3: Nano science and its application:

CO1: Students will get to know the nanoscale systems and nano structures.

CO2:Students will have the understanding of Synthesis of nan material and different characterisation techniques.

CO3: Understanding the various applications of nanoparticles, quantum dots, nanowires and thin films .

DSE4:Basic instrumentation

CO1: students will have a knowledge of basic of measurements, multimeter, voltmeter.

CO2:Understanding the CRO,Specifications of a CRO and their significance. Use of CRO for the measurements.

CO3:Understanding of Signal Generators and Analysis Instruments, digital Instruments, digital multimeter.