Lesson Plan 2026-27 (Odd Sem)

Name: Ms. Neha
Class: M.Sc. Physics 3rd Sem
Subject Name: Electronics
Sub Code : 25PHY203DS04
Number of days: 1,2,5,6

11Aug-31 Aug	Unit 1: Bipolar junction Transistor (BJT): Transistor action, Transistor biasing techniques and characteristics, Amplifying action, AC/DC load line, Transistor models and parameters, Equivalent circuits, Two-Port devices and Hybrid model, Transistor Hybrid model, Transistor h-parameters, Conversion for h-parameter for three Transistor Configurations, Analysis of a Transistor Amplifier Circuit for CE, CB, CC, Comparison of Transistor Amplifier Configurations, Linear Analysis of a Transistor Circuit, Miller's Theorem and its Dual, Cascading Transistor Amplifiers, classification of amplifiers, frequency response, RC coupled amplifier and its frequency response.
1 Sept-30SEPT	Unit 2: Feedback-positive and negative feedback, Effect of negative feedback on gain, Non-linear distortion, input resistance, Frequency response, Voltage series and shunt feedback, Current series feedback. Transistor Power amplifiers: Class A, Class B, Class A push pull and Class B push pull amplifier Principle of oscillations, condition for sustained oscillation, RF Oscillators using BJT, Hartley, Colpitts, Crystal Oscillator (Principle of working and frequency oscillation); AF Oscillators using BJT: Wein Bridge, Phase shift Oscillators. Multivibrator (Astable, Bistable, Monostable).
1 OCT-31 OCT	Unit 3: Differential amplifier, CMRR, circuit configuration, emitter coupled supplied with constant current, transfer characteristics, block diagram of Op. Amp. Off-set currents and voltages, PSRR, Slew rate, universal balancing techniques, Inverting and non-inverting amplifier, basic applications- summing, scaling, current to voltage and voltage to current signal conversion, differential dc amplifier, voltage follower, bridge amplifier, AC-coupled amplifier. Integration, differentiation, analog computation, Butterworth active filters circuits.
1NOV-9 NOV	***Diwali Vacations***
10NOV-6 DEC	Unit 4: Comparators, AC/DC converters: Half wave & full wave rectifier, clamping circuits, Logarithmic amplifier, antilogarithmic amplifier, sample and hold circuits Digital to analog conversion –ladder and weighted resistor types, analog to digital conversion- counter type, regenerative comparator (Schmitt trigger), Oscillators using op-amp,: Feedback, Square wave generator, pulse generator, triangle wave generator. Sinusoidal oscillators: Phase shift, Colpitts, Hartley and Wein Bridge oscillator.

Name: Mrs. NEELAM
Class: B.Sc. I (Single Major) Semester-1
Paper code: 24PHY401SE01
Subject Name: Electrical circuit & Instrumentation skills
Number of days: Friday, Saturday

11Aug-31Aug	Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter, Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. Electronic Voltmeter: Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. AC milli-voltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac milli-voltmeter, specifications and their significance.
1Sep-30 Sep	Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. (6 Lectures) Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.
1Oct-31Oct	Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter. (3 Lectures) Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution. Voltmeter. (3 Lectures) Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.
1Nov-9Nov	***Diwali Vacation***
10Nov-6Dec	Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.

Name: Mrs. NEELAM
Class: B.Sc. I (Physical Sciences) SEC, Semester-1
Paper code: 24PHY401SE01
Subject Name: Electrical circuit & Instrumentation skills
Number of days: Friday, Saturday

11Aug-31Aug	Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter, Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. Electronic Voltmeter: Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. AC milli-voltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac milli-voltmeter, specifications and their significance.
1Sep-30 Sep	Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. (6 Lectures) Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.
1Oct-31Oct	Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter. (3 Lectures) Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution. Voltmeter. (3 Lectures) Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.
1Nov-9Nov	***Diwali Vacation***
10Nov-6Dec	Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.

Name: Dr. Surender Kumar
Class: B.Sc. (Hons.) Physics Semester-V
Paper Code: 26PHYS405DS02
Subject Name: Electromagnetic Theory
Days: 1-2 days

11 Aug. – 10 Sept.	Unit-1: Maxwell's Equations and Fundamentals: Review of Maxwell's equations. Displacement current and its significance. Vector and scalar potentials. Gauge transformations: Lorentz and Coulomb gauges. Boundary conditions at the interface betweendifferent media. Test ofUnit-1
11 Sept. – 10 Oct.	Unit-2: Wave Equations and Electromagnetic Energy: Wave equations and solutions forelectromagnetic fields. Plane waves in dielectric media: Transverse nature and characteristics. Poynting theorem and Poynting vector. Electromagnetic energy density: Physical concepts ofenergy, momentum density, and angular momentum density. Test of Unit-2
11 Oct. – 31 Oct	Unit-3: EM Wave Propagation in Unbounded Media: Plane electromagnetic waves through vacuum and isotropic dielectric media. Refractive index, dielectric constant, and waveimpedance. Propagation through conducting media: Relaxation time and skin depth.EM wave propagation through dilute plasma: Electrical conductivity of ionized gases, plasmafrequency, refractive index, and skin depth. Applications to wave propagation through theionosphere. Test of Unit-3
1Nov-09 Nov	***Diwali Vacations***
11 Nov. – 06 Dec.	Unit-4: EM Wave Propagation in Bounded Media: Boundary conditions at a plane interface between two media. Reflection and refraction of plane waves at plane interfaces between twodielectric media. Fresnel's formulae for perpendicular and parallel polarization cases.Brewster's law, reflection and transmission coefficients. Total internal reflection, evanescentwaves, and metallic reflection (normal incidence). Test of Unit-4

Name: Dr. Ekta
Class: B.Sc. Single Major (Physics) Semester-III
Paper code: 25PHYS403DS01
Subject Name: Thermal Physics
Number of Days: 3-4

11 Aug.- 31 Aug.	Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature, Concept of Work & Heat, State Functions, First Law of Thermodynamics and its differential form, Internal Energy, First Law & various processes, Applications of First Law: General Relation between CP and CV, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient. Test
1 Sept. - 30 Sept.	Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines. Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale. test
1 Oct. – 31 Oct.	Entropy: Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics. Unattainability of Absolute Zero. Thermodynamic Potentials and Maxwell's Thermodynamic Relations: Extensive and Intensive Thermodynamic Variables. Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy. Assignment
1 Nov. – 9 Nov.	***Diwali Vacation***
10 Nov.- 6 Dec.	Their Definitions, Properties and Applications. Surface Films and Variation of Surface Tension with Temperature. Magnetic Work, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations. Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) Clausius Clapeyron equation, (2) Values of Cp-Cv, (3) Tds Equations, (4) Joule-Kelvin coefficient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process. Revision Test

Name: Dr. Ekta
Class: B.Sc. Single Major (Physics) Semester-V
Paper code: 25PHYS405DS03
Subject Name: Introductory Quantum Mechanics
Number of Days: 1-2

11 Aug.- 31 Aug.	Failure of (Classical) E.M. Theory, quantum theory of radiation (old quantum theory), Photon, photoelectric effect and Einstein's photoelectric equation Compton effect (theory and result). Franck-Hertz experiment. Inadequacy of old quantum theory, de-Broglie hypothesis. Davisson and Germer experiment. G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle. Time-energy and angular momentum, position uncertainty. Uncertainty principle from de-Broglie wave, (wave-particle duality). Gamma Ray Microscope, Electron diffraction from a slit.
1 Sept. - 30 Sept.	Basic postulates and formalism: properties of Wave Function, Interpretation of Wave Function, Condition for physical acceptability of Wave Functions. Eigenvalues and Eigen functions, Probability current density, Expectation values of position and linear momentum, Ehrenfest‟s theorem. Time dependent and time independent Schrodinger equation, Mathematical consideration of Schrodinger equation: Normalization, Orthogonality, Observables, Stationary states, Position, Linear momentum & Energy operators; commutator of position and linear momentum operators; Test
1 Oct. – 31 Oct.	Application of Schrodinger equation in the solution of the following one-dimensional problems: (i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti-nodes, zero-point energy). (ii) One dimensional step potential $E > Vo$ (Reflection and Transmission coefficient) (iii) One dimensional step potential $E < Vo$ (penetration depth calculation). (iv) One dimensional potential barrier, $E > Vo$ (Reflection and Transmission coefficient). (v) Onedimensional potential barrier, $E < Vo$ (penetration or tunnelling coefficient). (VI) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, Zero-point energy, wave equation for ground state and excited states). Test
1 Nov. – 9 Nov.	***Diwali Vacation***
10 Nov.- 6 Dec.	Gamow theory of alpha decay. Quantum phenomenon of tunnelling. Tunnel diodequalitative description. Spectrum for a square well (mention upper bound-no calculation). Bound state problems: General features of a bound particle system. Particle in a spherically symmetric potential rigid rotator. Orbital angular momentum and azimuthal quantum numbers and space quantization. Physical significance. Radial solutions and principal quantum number. Hydrogen atom. Revision

Name: Neeraj Kadian
Class: M.Sc Physics
Paper code: Phy- 24PHY201DSO2
Subject Name: Classical Mechanics
Number of days: (3-6)

1 Sept – 30 Sept	Survey of Elementary Principles and Lagrangian Formulation: Newtonian mechanics of one and many particle systems, Conservation laws, Constraints and their classification, Generalized coordinates and momenta, Principle of virtual work, D' Alembert's principle and Lagrange's equation, Velocity dependent potentials and dissipation function, Simple applications of Lagrangian formulation, Cyclic coordinates, Symmetries of space and time and conservation laws, Invariance of Lagrangian under Galilean transformation. Moving coordinate systems and Motion in a central force field: Rotating frames, inertial forces, terrestrial applications of Coriolis force, Two body problem: Reduction to equivalentone body problem,
1 Oct – 31 Oct	Central force definition and characteristics, the equation of motion and first integrals, differential equation for the orbit, general analysis of orbits, condition for closure and stability of circular orbits, Kepler's laws and equations, Rutherford scattering.SEMINAR-1. Legendre Transformation and Hamilton's equations of motion, Some techniques of calculus of variation, Variational principle, Hamilton's principle from D'Alembert's principle, Lagrange's equation from Hamilton's principle, Hamilton's equations from variational principle, variation and end points, Principle of least action and its forms.
01 Nov-10 Nov.	**Diwali Vacations**
11 Nov – 06 Dec	Canonical transformations, Generating functions, Properties of Poisson bracket, Equation of motion in Poisson bracket, Angular momentum and Poisson bracket relations, Jacobi identity, Invariance of Poisson brackets using canonical transformations, Potential Energy and equilibrium: Stable, unstable and neutral equilibrium, One-dimensional Oscillator, Two coupled oscillators: Solution of differential equation to find normal coordinates and normal modes, Theory of small oscillations, Examples of coupled oscillators: Two coupled pendulum, double pendulum, Free vibrations of a linear triatomic molecule.

Name: Dr. Preeti Chhokkar
Class: B.Sc II(Single Major) IIIrd Sem
Paper code: 25PHYS403DS02
Subject Name- Vibrational &Wave optics
Number of days: 3,4

11 Aug-31 Aug	**Unit 1:** Superposition of Collinear Harmonic oscillations: Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equal frequency differences.
01Sep – 30 Sept	**Unit 2:** Wave equation. Traveling waves, Plane and spherical waves. Superposition of two harmonic waves. Standing waves on a string. Superposition of N harmonic waves. Pulses and wave packets. Introduction to different models, light waves, electromagnetic nature of light waves. Coherence and Interference: Interaction of independent light sources. Classification in terms of division of amplitude and division of wave front. Young's double slit experiment.
1Oct - 31 Oct	**Unit 3:** Lloyd's mirror and Fresnel's biprism. Interference in thin films parallel and wedge-shaped films. Fringes of equal inclination (Haidinger fringes) and fringes of equal thickness (Fizeau fringes). Michelson's interferometer: Theory, form of fringes (mention only), applications, visibility of fringes. Theory of partial coherence. Coherence time and coherence length, i.e., temporal and spatial coherence. Fabry-Perot interferometer: Theory, Airy's formula, sharpness of fringes, finesse, visibility of fringes
01 Nov– 09 Nov	***Diwali Vacation***
10Nov – 06 Dec	**Unit 4:** Fraunhofer diffraction: Single slit, rectangular and circular aperture. Multiple slits. Plane diffraction grating. Resolving power and depressive power of a plane diffraction grating. Fresnel diffraction: Fresnel's integrals, Cornu's spiral, Fresnel diffraction pattern at a straight edge, a slit and a wire (qualitatively using Cornu's spiral). Holography: Principle of holography, recording and reconstruction method and its theory as interference between two plane waves.

Name: Dr. Preeti Chhokkar
Class: B.Sc II(Single Major) IIIrd Sem
Paper code: 25PHYS402SE01
Subject Name- Applied Optics
Number of days: 5,6

11 Aug-31 Aug	**Unit 1:** Fresnel diffraction: Fresnel's integrals, Cornu's spiral, Fresnel diffraction pattern at a straight edge, a slit and a wire (qualitatively using Cornu's spiral). Fraunhofer diffraction: Single slit, rectangular and circular aperture. Multiple slit. Plane diffraction grating. Resolving power and depressive power of a plane diffraction grating.
01Sep – 30 Sept	**Unit 2:** Concept of Spatial frequency filtering, Fourier transforming property of a thin lens, Fourier Transform Spectroscopy (FTS): measuring emission and absorption spectra, applications in atmospheric remote sensing, NMR spectrometry, and forensic science.
1Oct - 31 Oct	**Unit 3:** Holography: Introduction, Basic principle and theory, recording and reconstruction processes, Requirements of holography-coherence, Types of holograms, The thick or volume hologram, Multiplex hologram, white light reflection hologram, application of holography in microscopy, interferometry, and character recognition.
01 Nov– 09 Nov	***Diwali Vacation***
10 Nov – 06 Dec	**Unit 4:** Optical fibres: Introduction and historical remarks, Total Internal Reflection, Basic characteristics of the optical fibre: Principle of light propagation through a fibre, the coherent bundle, The numerical aperture, Attenuation in optical fibre and attenuation limit; Single mode and multimode fibres, Fibre optic sensors: Fibre Bragg Grating.

Name: Dr. Rangeeta Dhaka
Class: B.Sc. III (Minor) 5th Sem,
Paper code: 26PHY405MV01
Subject Name: Nanotechnology
Number of days: 3, 4

11 Aug – 31 Aug	Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nanodots, thin films, nanowires, nanorods), Band structure and density of states of materials at nanoscale, Size Effects in nano systems, Quantum confinement: Applications of Schrodinger equation- Infinite potential well, potential step, potential box, quantum confinement of carriers in 3D, 2D, 1D nanostructures and its consequences.
1 Sept – 30 Sept	Top down and Bottom-up approach, Photolithography. Ball milling, Gas phase condensation, Vacuum deposition, Physical vapor deposition (PVD): Thermal evaporation, E-beam evaporation, Pulsed Laser deposition, Chemical vapor deposition (CVD), Sol-Gel. Electro deposition, MBE growth of quantum dots.
1 Oct – 31 Oct	X-Ray Diffraction, FTIR, UV Visible, Optical Microscopy.Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy.
1 Nov – 9 Nov	***Diwali Vacation***
10 Nov – 6 Dec	Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells), CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical data storage, Magnetic quantum well; magnetic dots - magnetic data storage, Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

Name: Dr. Rangeeta Dhaka
Class: B.Sc. I (Major Physics) 1st Sem,
Paper code: 24PHYS401SE01
Subject Name: Basic Instrumentation Skills
Number of days: 5, 6

11 Aug – 31 Aug	Basic of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/Multimeter and their significance. AC milli-voltmeter: Type of AC millivolt meters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac milli-voltmeter, Specifications and their significance.
1 Sept – 30 Sept	Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.
1 Oct – 31 Oct	Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Single-phase, three phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters and motors. Speed & power of ac motor.
1 Nov – 9 Nov	***Diwali Vacation***
10 Nov – 6 Dec	Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overloaddevices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Relay protection device. Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays. Splices: wirenuts, crimps, terminal blocks, and solder. Preparation of extension board.

Name: Dr. Simran Nehra
Class: B.Sc III (NM) Vth Sem
Paper code: 26PHYM405DS01
Subject Name: Quantum Mechanics and Nuclear Physics
Number of days: 5&6

11AUG – 31 AUG	Failure of Classical E.M. Theory, quantum theory of radiation (old quantum theory), Photon, photoelectric effect and Einstein's photoelectric equation Compton effect (theory and result). Franck-Hertz experiment. Inadequacy of old quantum theory, deBroglie hypothesis. Davisson and Germer experiment. Phase velocity group velocity, Heisenberg's uncertainty principle. Time-energy and angular momentum, position uncertainty. Uncertainty principle from de-Broglie wave, (wave-particle duality). Gamma Ray Microscope.
1 SEPT-30 SEPT	Basic postulates and formalism: properties of Wave Function, Interpretation of Wave Function, Condition for physical acceptability of Wave Functions. Eigenvalues and Eigen functions, Probability current density, Expectation values of position and linear momentum. Time dependent and time independent Schrodinger equation, Mathematical consideration of Schrodinger equation: Normalization, Orthogonality, Observables. Application of Schrodinger equation in the solution of the following one-dimensional problems: (i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and antinodes, zero-point energy).
1 OCT - 31 OCT	Nuclear mass and binding energy, systematics nuclear binding energy, nuclear stability, nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept), Determination of charge by Mosley law Determination of size of nuclei by Rutherford Back Scattering. Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Energetics of alpha -decay, Range and straggling of alpha particles. Geiger-Nuttal law.
1 NOV-9 NOV	***Diwali Vacations***
10 NOV-06 DEC	Introduction of light charged particle (Beta-particle), Origin of continuous beta-spectrum (neutrino hypothesis) types of beta decay and energetics of beta decay, Energy loss of beta-particles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passage of Gamma radiations through matter (photoelectric, Compton and pair production effect) electron position anhelation. Absorption of Gamma rays (Mass attenuation coefficient) and its application. Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors (Principles, construction, working and use). Ionization chamber, proportional counter, G.M. counter detailed study.

Name: Dr. Simran Nehra
Class: B.Sc Physical Science 3rd sem
Paper code: 25PHY403SE01
Subject Name: Workshop Skills in Physics
Number of Days – (5-6)

11AUG – 31 AUG	Measuring units. conversion to SI and CGS. Familiarization with meter scale, Vernier calliper, Screw gauge and their utility. Measure the dimension of a solid block, volume of cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet, etc. Use of Sextant to measure height of buildings, mountains, etc.
1 SEPT-30 SEPT	Use of Multimeter. Soldering of electrical circuits having discrete components (R, L, C, diode) and ICs on PCB. Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer Theorem, Basics of Power Supplies, AC Power Supplies: Characteristics, use in basic circuits. DC Power Supplies: Fixed voltage vs. variable voltage supplies. Components of power supplies:
1 OCT - 31 OCT	Transformers, rectifiers (half-wave, full-wave), filters, and regulators. Voltage Regulation and Ripple Reduction, Concepts of regulation, ripple, and stability. Use of capacitors, Zener diodes, and IC voltage regulators (e.g., LM317). Introduction to C.R.O., Basic structure and working of a C.R.O. Electron gun, deflection system, and phosphor screen. Block diagram and function of each component.
1 NOV-9 NOV	***Diwali Vacations***
10 NOV-06 DEC	Operating a C.R.O. Adjusting controls: Time base, volts/div, focus, intensity, and trigger. Connecting probes and setting ground reference. Applications of C.R.O. Measurement of voltage, frequency, and phase difference. Observation of waveforms: Sine, square, and triangular waves. Troubleshooting electrical circuits

Name: Ms. Anju Rani
Class: M.Sc.(P) Ist Sem
Paper code: 24PHY201DS03
Course Code: Quantum Mechanics –I
Number of days: 1, 2, 5. 6
Program Code: PHY2

01Sep – 30 Sept	Introduction, General formalism of Quantum Mechanics: States and operators. Representation of States and dynamical variables; Linear vector space; Bra Ket notation, Linear operators; Orthonormal set of vectors, Completeness relation; Hermitian operators, their and eigenvectors, The fundamental commutation relation; Commutation rule and the uncertainty relation; Simultaneous eigenstates of commuting operators; The unitary transformation; Dirac delta function; Relation between kets and wave functions.
1Oct - 31 Oct	Matrix representation of operators; Solution of linear harmonic oscillator problem by operator methods**.** Angular momentum operator: Angular momentum operators and their representation in spherical polar co-ordinates; Eigenvalues and eigenvectors of L2 , spherical harmonics; Commutation relations among Lx Ly Lz ; Rotational symmetry and conservation of angular momentum; Eigenvalues of J2 and Jz and their matrix representation; Pauli spin matrices; Addition of angular momentum.
01 Nov– 09 Nov	***Diwali Vacation***
10Nov – 06 Dec	Solution of Schrodinger equation for three dimensional problems: The three-dimensional harmonic oscillator in both Cartesian and spherical polar coordinates, Eigen values, Eigen functions and the degeneracy of the states; Solution of the hydrogen atom problem, the eigenvalues, Eigen functions and the degeneracy Perturbation Theory : Time independent perturbation theory; Non degenerate case, the energies and wave functions in first order the energy in second order; Anharmonic xλperturbations of the form 3 xλand 4 ; Degenerate perturbation theory; Stark effect of the first excited state of hydrogen.

Name: Dr. Manju vashistha
Class: B.Sc. I (Physical Sciences), Semester-1
Paper code: 24PHY401DS01
Subject Name: Mechanics and Theory of Relativity
Number of days: Mon-Tues

11Aug-31Aug	Basics of Mechanics: Mechanics of single and system of particles, Conservation law of linear momentum, Angular momentum and mechanical energy for a particle and a system of particles, Centre of Mass and equation of motion, Constrained Motion. Work and Kinetic Energy Theorem. Conservative and neoconservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.
1Sep-30 Sep	Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator, Simple pendulum, Atwood's machine
1Oct-31Oct	Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof. Moment UG Multidisciplinary Program(s) with Hons. in One Major Program(Physics) w.e.f. 2024-25 session M.D. University, Rohtak-124001 (Haryana) of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section. Acceleration of a body rolling down on an inclined plane. Kinetic energy of rotation. Motion involving both translation and rotation.
1Nov-9Nov	***Diwali Vacation***
10Nov-6Dec	Special Theory of Relativity: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector.

Name: Dr. Manju vashistha
Class: B.Sc. I (Single Major Physics), Semester-1
Paper code: 24PHYS401DS01
Subject Name: Mechanics
Number of days: Wed-Thurs

11Aug-31Aug	Basics of Mechanics: Mechanics of single and system of particles, Conservation law of linear momentum, Angular momentum and mechanical energy for a particle and a system of particles, Centre of Mass and equation of motion, Constrained Motion. Work and Kinetic Energy Theorem. Conservative and neoconservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.
1Sep-30 Sep	Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator, Simple pendulum, Atwood's machine
1Oct-31Oct	Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof. Moment UG Multidisciplinary Program(s) with Hons. in One Major Program(Physics) w.e.f. 2024-25 session M.D. University, Rohtak-124001 (Haryana) of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section. Acceleration of a body rolling down on an inclined plane. Kinetic energy of rotation. Motion involving both translation and rotation.
1Nov-9Nov	***Diwali Vacation***
10Nov-6Dec	Special Theory of Relativity: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum.

Name: Mr. Pardeep Kumar
Class: M.Sc. 3rd Sem Physics
Subject Name: Nuclear and Particle Physics
Sub Code : 25PHY203DS01
Number of days: 1 &2,5&6

11Aug-31Aug	Unit 1: Two nucleon problem: Common potentials used for calculation of nuclear forces viz. Wigner, Majorana, Bartlett and Heisenberg potentials, The ground state of deuteron, Square well solution for the deuteron, Qualitative features of Nucleon – nucleon scattering, Effective range theory in n – p scattering and Significance of sign of scattering length; Meson theory of nuclear force (Qualitative discussion);Types of nuclear reactions: compound and direct nuclear reactions, Reaction cross – section, Reaction cross-section in terms of partial wave treatment, Balance of mass and energy in nuclear reactions, Q equation and its solution.
1Sep-30 Sep	Unit 2: Liquid drop model: Similarities between liquid drop and nucleus, Semi-empirical mass formula, Mass Parabolas (Prediction of stability against β-decay for members of an Isobaric family), Stability limits against spontaneous fission, Merits and limitations of Liquid drop model; Shell model: Experiment evidences for shell effect, Magic numbers, Main assumptions of the single particle shell model, Spin-orbit coupling in single particle shell model, Estimation of spin, parities and magnetic moments of nuclei by single particle shell model.
1Oct-31Oct	Unit 3: Nuclear Decays: Alpha (α) decay, α- disintegration energy, Range of α-particles, Range – energy relationship for α-particles and Geiger – Nuttall law; Beta decay, Pauli's neutrino hypothesis, Fermi theory of beta decay, Curie plot, selection rules for beta decay, Fermi and Gamow-Teller Transitions, Detection and properties of neutrino; Gamma decay, Multipole transitions in nuclei, Angular momentum and parity selection rules; Internal conversion
1Nov-9Nov	***Diwali Vacations***
10Nov-6Dec	Unit 4: Elementary Particle Physics: Classifications of elementary particles: fermions and bosons, particles and antiparticles; Fundamental interactions in nature; Type of interaction between elementary particles: Symmetry and conservation laws; Classification of hadrons: Strangeness, Hypercharge, Gelleman - Nishijima formula, Elementary ideas of CP and CPT invariance; Quark model, Baryon Octet, Meson Octet, Baryon Decuplet, Gell-Mann-Okubo formula for octet and decuplet, the necessity of introducing the colour quantum number.

Name : Priya
Class : B.Sc II (Physical science) 3rd Sem
Paper code : 25PHY403DS01
Subject Name : Optics

Number of days : (1-2)

11Aug – 31Aug	INTERFERENCE: Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference, Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet, phase change on reflection. Interference by Division of Amplitude: Plane parallel thin film, production of colours in thin films, classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film, Newton's rings
1 Sept – 30Sept	DIFFRACTION Fresnel's diffraction: Huygens-Fresnel's theory, Fresnel's assumptions, rectilinear propagation of light, diffraction at a straight edge, rectangular slit and diffraction at a circular aperture. Fraunhoffer diffraction: Single slit diffraction, double slit diffraction, plane transmission grating spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating.
1Oct - 31Oct	POLARIZATION: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction, Huygens's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light. Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz)
1Nov – 9Nov	***Diwali Vacation.***
10Nov– 6Dec	LASERS: Basic concept of absorption and emission of radiations, amplification and population inversion; Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator; Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (Spatial & Temporal coherence); Metastable state, Excitation mechanism and Types of Lasers (He-Ne Laser & Ruby Laser), Applications of Lasers. FIBRE OPTICS: Optical fibres and their properties, Principal of light propagation through a optical fibre, Acceptance angle and numerical aperture, Types of optical fibres: Single mode and multimode fibres, Advantages and Disadvantages of optical fibres.

Name: Renu Kumari
Class: M.Sc Physics
Paper code: Phy- 24PHY201DSO1
Subject Name: Mathematical Physics

Number of days (1-4)

1 Sept – 30 Sept	Vector spaces, Norm of a Vector, Linear independence & dependence, Basis and dimension, Isomorphism of Vector spaces, Scalar/Inner product of vectors, Orthonormal basis, GramSchmidt Orthogonalization process, Linear operators, Matrices, Cayley-Hamiltion Theorem, Inverse of matrix, Orthogonal, Unitary and Hermitian matrices, Eigenvalues and eigenvectors of matrices, Similarity transformation, Matrix diagonalization, Simultaneous diagonalization and commutativity, Unit-2: Second order linear differential equation with variable coefficients, Ordinary point, Singular point, Series solution around an ordinary point, Series solution around a regular singular point; the method of Frobenius,
1 Oct – 31 Oct	Wronskin and getting a second solution, Solution of Legendre's equation, Solution of Bessel's equation, Solutions of Laguerre and Hermite's equations . Unit-3 Special functions, Generating functions for Bessel function of integral order Jn(x), Recurrence relations, Integral representation; Legendre polynomials Pn(x), Generating functions for Pn(x), Recurrence relations, orthogonality, Rodrigue's Relation;
01 Nov-10 Nov.	***Diwali Vacations***
11 Nov – 06 Dec	Hermite Polynomials; Generating functions, Rodrigue's relation &orthogonality for Hermite polynomials; Laguerre polynomials; Generating function and Recurrence relations,Orthogonality, Rodrigue's Relation, The Gamma Function, The Dirac – Delta Function.Integral transform, Laplace transform, Properties of Laplace transforms such as first and second shifting property, Laplace Transform of Periodic Functions, Laplace transform of derivatives, Laplace Transform of integrals, Inverse Laplace Transform by partial fractions method, Fourier series, Evaluation of coefficients of Fourier series Cosine and Sine series, Applications of Fourier Series, Fourier Transforms, Fourier sine Transforms, Fourier cosine Transforms, Fourier transform of derivatives, Applications of Fourier Transforms

Name: VIKAS
Class: M.Sc Ist Semester
Paper code: 24PHY201DS04
Subject Name: Physics of Electronic Devices
Number of days: 1-2 &5-6

28 Aug-31 Aug	Charge carriers in semiconductors: Energy bands, metals, Semiconductors and insulators, Direct and indirect band gap semiconductors, Variation of energy bands with alloy composition, Electrons and holes, effective mass, Intrinsic and extrinsic semiconductors, Concept of Fermi level, Electron and hole concentration at equilibrium, Temperature dependence of carrier concentrations, Compensation and space charge neutrality, Conductivity and mobility, Effect of temperature and doping on mobility, Hall effect, Invariance of Fermi level
01Sep – 30 Sept	Carrier transport in semiconductors: Optical absorption and luminescence, Carrier lifetime and photoconductivity, Direct/indirect recombination of electrons and holes, Traps and defects, Steady state carrier generation, Quasi Fermi levels, Diffusion and drift of carriers, Diffusion and recombination, Diffusion length, Haynes Shockley experiment, Gradient in quasi Fermi level, External and internal photoelectric effect
1Oct - 31 Oct	Diode physics and optoelectronic devices: P-N junction diode: Basic structure, Energy band diagram, Built-in potential, Electric field, Space charge width and qualitative description of current flow, Derivation of diode current equation, Zener diode: breakdown mechanisms, Voltage regulator circuit, Power diode, Varactor diode, Optoelectronic devices: Vacuum photodiode, Photo-multipliers tube, P-N junction photodiode, Pin photodiode, Avalanche photodiode, Phototransistor, Solar cell, Light emitting diode (LED), Diode laser: Condition for laser action and optical gain
01 Nov– 09 Nov	***Diwali Vacation***
10Nov – 06 Dec	Transistors: Bipolar junction transistor (BJT),Transistor operating modes, Transistor action, Transistor biasing configurations and characteristics, Field effect transistors: Junction field effect transistor (JFET), Metal oxide semiconductor field effect transistor (MOSFET), Negative resistance devices: Tunnel diode, Backward diode, Uni-junction transistor, p-n-p-n devices and their characteristics, Silicon controlled rectifier and switch and their characteristics. (**Revision)** ***(Test)***

Name: Ms. Priya
Class: B.Sc. Life Sc. 1st Sem
Subject Name: Physics in Everyday Life
Sub Code : 25PHY203DS04

Number of days: 1,2,5,6

11Aug- 31August	MECHANICS: Every day activities related to Force, weight, work, energy, power and centrifuge; washing machine. Numericals and Test.
1 Sept-30sept	HEAT: Variation of boiling point with pressure, pressure cooker, cooling by expansion, refrigerator, air conditioner, Bernoulli principle Bunsen burner, aero-plane. Numericals and Test.
1Oct-31Oct	SOUND AND OPTICS: Sound waves, Doppler Effect, power of lens, long sight and short sight, microscope, telescope, binocular camera, video camera. Numericals and Test.
1Nov-9Nov	***Diwali Vacation***
10Nov- 6Dec	ELECTRICAL AND ELECTRONIC APPLIANCES: Working of the tube light and fan, kilowatt hour, fuse and heating elements, microwave oven, electric heater, photoelectric effect. Test and Assignments.

Name : Sonu
Class : M.Sc
Paper code : 25PHY203DS02

Subject Name : Electrodynamics and Wave propagation
Number of days : (3-6)

11Aug-31Aug	Review of four, vector and Lorentz transformation in four, dimensional space; Conservation of charge and four current density; Electromagnetic field tensor in four dimensions and Maxwell's equations; Lorentz invariants of electromagnetic fields; Dual field tensor; Transformation of electric and magnetic field vectors; Covariance of force equation.
1Sep-30 Sep	Radiating systems: Field and radiation of a localized source; Oscillating electric dipole; Centre fed linear antenna; Lienard, Wiechert potential; Electric and magnetic fields due to a uniformly moving charge and accelerated charge; Linear and circular acceleration and angular distribution of power radiated.
1Oct-31Oct	Radiative reaction force; Scattering and absorption of radiation; Thompson scattering and Rayleigh scattering; Normal and anomalous dispersion; Ionosphere; Propagation of electromagnetic wave through ionosphere; Reflection of electromagnetic waves by ionosphere; Motion of charged particles in uniform E and B fields; Time varying fields
1Nov-9Nov	***Diwali Vacations***
10Nov-6Dec	Fields at the surface of and within a conductor; Wave guides; Modes in a rectangular waveguide; Attenuation in waveguides; Dielectric waveguides; Circuit representation of parallel plate transmission lines; Transmission line equations and their solutions; Characteristic impedance and propagation coefficient; Low loss radio frequency and UHF Transmission lines. .

Name: Sonu
Class: B.Sc Physics (hons)
Paper code: Phy-501
Subject Name: Mathematical Physics
Number of days: (1-2)

8 Aug – 31 Aug	Introduction to groups, rings and fields. Vector spaces and subspaces. Linear independence basis and dimensions. Linear transformations.
1 Sept – 13 Oct	Algebra of linear transformations. Non-singular transformations. Isomorphism. Representation of linear transformations by matrices.
14 oct – 22 Oct	***Diwali Vacations***
23oct-18 Nov	Matrix algebra Addition and multiplication null and unit matrices. Singular and non singular matrices. Inverse of a matrix Eigenvalues and eigenvectors. Digitalization solution of coupled linear ordinary differential equations.
19Nov– 30 Nov	Special matrices: Hermitian and skew symmetric and antisymmetric, orthogonal and unitary matrices Similarly transformations and bilinear and quadratic forms. Trace of a matrix Cayley Hamilton theorem. Function of a matrix. Metric spaces. Inner product and metric concept.

Name: Ms. SANKET
Class: M.Sc. (Physics) Semester-III
Paper code: 25PHY203DS06
Subject Name: Computational Physics – I
Number of Days: 1-4

11 Aug – 31 Aug	Numerical Integration: Newton-cotes formulae: Trapezoidal rule, Simpson's 1/3 rule, error estimates in Trapezoidal rule and Simpson 1/3 rule using Richardson deferred limit approach; Gauss-Legendre quadrature method; Monte Carlo (mean sampling) method for single, double and triple integrals. Numerical Differentiation: Taylor Series method; Generalized numerical differentiation: truncation errors. Roots of Linear, Non-linear Algebraic and Transcendental equations: Newton-Raphson method; convergence of solutions. Curve Fitting: Principle of least square; Linear regression; Polynomial regression; Exponential and Geometric regression.Test
1 Sept – 13 Oct	Interpolation: Finite differences; Interpolation with equally spaced points; Gregory - Newton's Interpolation formula for forward and backward interpolation; Interpolation with unequally spaced points: Lagrangian interpolation, Solution of Simultaneous Linear Equations: Gaussian elimination method, Pivoting; Gauss- Jordan elimination method; Matrix inversion. Eigen values and Eigen vectors: Jacobi's method for symmetric matrix test
14 oct – 22 Oct	Numerical Solution of First Order Differential Equations: First order Taylor Series method; Euler's method; Runge-Kutta methods; Predictor corrector method; Elementary ideas of solutions of partial differential equations, Numerical Solutions of Second Order Differential Equation: Initial and boundary value problems: shooting methods. Assignment
23oct-18 Nov	***Diwali Vacation***
19Nov– 30 Nov	Computer basics and operating system: Elementary information about digital computer principles; basic ideas of operating system, DOS and its use (using various commands of DOS); Compilers; interpreters; Directory structure; File operators. Introduction to FORTRAN 77:Data types: Integer and Floating point arithmetic; Fortran variables; Real and Integer variables; Input and Output statements; Formats; Expressions; Built in functions; Executable and non-executable statements; Control statements; Go To statement; Arithmetic IF and logical IF statements; Flow charts; Truncation errors, Round off errors; Propagation of errors, Block IF statement; Do statement; Character DATA management; Arrays and subscripted variables; Subprograms: Function and SUBROUTINE; Double precision; Complex numbers; Common statement; New features of FORTRAN 90... Revision Test

Name: Mrs. Pooja Rani
Class: B.sc 5th Sem
Paper code: 26PHYS405DS04
Subject Name: Mathematical Physics
Number of days (1-4)

11 Aug – 31 Aug	Singular points of second order linear Differential equations, Frobenius method and its applications to differential equations, Legendre ,Bessel, hermite equations, Properties of Legendre Polynomials, Rodrigues Formula, Generating Function, Expansion of function in a series of Legendre Polynomials, Bessel Functions of the first kind, Generating function, Zeros of Bessel function and orthogonality.
1 Sept – 30Oct	Classification of partial differential equation, solution of PEDs with separation of variables and eigen functions, Laplace equation and its solution in Cartesian, spherical polar with axially symmetric coordinate system and cylindrical polar with with infinite cylinder coordinate system , solution of 1-D equations in 1-D, solution of heat equations
1 Oct – 31 Oct	Complex numbers, Eulers formula , Roots of complex numbers ,function of complex variable, Roots of complex number, singular functions, poles , branch points, branch cuts, integration of function, Cauchy inequality , integral formula, Laurent and taylor expansion, residue theorem ,definite integrals
01 Nov – 9 Nov	***Diwali Vacations***
10Nov– 06Dec	Cartesian tensor, zero order tensor, second and higher order tensor, algebra of tensor,algebra of tensor, multiplication ,isotropic tensor, dual tensor, pseudo tensor, dual tensor, moment of inertia. General coordinate transformation and tensor transformation , Lorentz transformation, four vectors . Covarient formulation of Maxwell equation

Name: Mrs. Pooja Rani
Class: B.Sc. 3rd Sem life sc.
Subject Name: Elements of Modern Physics
Sub Code : 25PHY403MI01
Number of days: 3&4

11Aug - 31Aug	**Unit 1: Foundations of Quantum Physics:** Planck's quantum hypothesis and the concept of photons. Photoelectric effect: Qualitative explanation and applications. Compton scattering: Basic understanding. De Broglie wavelength and matter waves, Davisson-Germer experiment: Experimental verification of matter waves.
01sept-30 sept	**Unit 2: Atomic Structure and Wave-Particle Duality:** Limitations of Rutherford's model: Atomic instability and discrete spectra. Bohr's quantization rule and energy levels of hydrogen-like atoms (qualitative only). Wave-particle duality and Heisenberg uncertainty principle: Simple examples and applications. Energy-time uncertainty principle
1 oct- 31oct	**Unit 3: Basics of Quantum Mechanics**: Two-slit interference experiment with photons and particles, Introduction to Schrödinger equation, Physical interpretation of the wave-function and probability concepts. One-dimensional infinitely rigid box: Energy levels and relevance in quantum dots. Tunnelling effect, Step potential (qualitative only) and applications.
01Nov-09Nov	***Diwali Vacations***
10 Nov- 06 Dec	**Unit 4: Nuclear Physics and Applications:** Basic structure of the nucleus: Size, atomic weight, and binding energy. Radioactivity: Stability of nucleus, laws of decay, and half-life. Overview of α decay, β decay (neutrino hypothesis), and γ-ray emission. Introduction to nuclear fission and fusion: Energy generation, mass deficit, and thermonuclear reactions. Applications of nuclear energy: Brief on nuclear reactors and their principles.