

Teaching Plan 2025-2026 (Odd Semester)
(July 2025 to December 2025)

Name: Dr. Uma Shekhawat

Department: Physics

Subject: Mechanics and Theory of Relativity (24PHY401DS01)

Class: B.Sc. 1st Semester

Month	1st Week	2nd Week	3rd Week	4th Week	5th Week
July			Introduction to Mechanics, Mechanics of a single particle	Mechanics of a system of particle	Mechanics of a system of particle
August	Centre Of Mass and related theorems	Constraints, Degree Of Freedom	Assignment and text book questions	Generalised Coordinates	_____
September	Hamiltonian Variational Principle, Lagrangian Equation of Motion	Applications of Lagrangian Equation of Motion by using Hamiltons Principle	Applications of Lagrangian Equation of Motion by using Hamiltons Principle	Assignment and text book questions	Introduction to Rotation motion, Theorems of moment of inertia
October	Theorems of moment of inertia,	Moment of inertia of Rectangular Rod, Sphere	Moment of inertia of Cylinder, Acceleration of a roling body over an inclined plane	Assignment and text book questions	_____
November	Galilean Transformation Equation, Michelson Interferrometer	Lorentz Transformation Equation and Its Application	Assignment and text book questions		.

Teacher in charge: Dr. Uma Shekhawat

Teaching Plan 2025-26 (Odd Semester)
(July 2025 to December 2025)

Name: Dr. Uma Shekhawat

Department: Physics

Subject: Solid State Physics (PH-501)

Class: B.Sc. 5th Semester

Month	1st Week	2nd Week	3rd Week	4th Week	5th Week
July			Crystalline and Glassy Forms, Liquid Crystals	Crystal Structure, Lattice and Basic Crystal Translational Vectors and Axes	Unit Cell and Primitive Cell, Wigner seitz Primitive Cell
August	Symmetry Operations for 2-D Crystal	Bravais Lattices in 2-D and 3-D	Assignment and text book questions	Crystal Planes and Miller Indices	_____
September	Miller Indices, Interplaner Spacing	Crystal Structure of ZnS, NaCl and Diamond	X-Ray Diffraction, Bragg's Law	Experimental X-Ray Diffraction Methods, K-Space	Assignment and text book questions
October	Reciprocal Lattice and its Physical Significance	Reciprocal Lattice Vectors, Reciprocal Lattice Vectors to a Simple Cubic Lattice	Reciprocal Lattice Vectors to a Body Centered Cubic, Face Centered Cubic	Specific Heat of Solids	_____
November	Einstein's Theory and Debye Model of Specific Heat of Solids	Assignment and text book questions	Revision of Full Syllabus	_____	_____.

Teacher in Charge: Dr. Uma Shekhawat

Lesson Plan: Electrodynamics Jagriti Dewan MSc Physics 3 sem

Month / Week	Week 1	Week 2	Week 3	Week 4	Week 5
August	Unit 1: Review of four-vector and Lorentz transformation; Conservation of charge and current density.	Unit 1: Electromagnetic field tensor; Maxwell's equations; Lorentz invariants of electromagnetic fields.	Unit 1: Dual field tensor; Transformation of electric and magnetic field vectors.	Unit 1: Covariance of force equation; Revision & numerical problems.	Assignment 1 & discussion.
September	Unit 2: Radiating systems; Field and radiation of a localized source; Oscillating electric dipole.	Unit 2: Centred linear antenna; Lienard-Wiechert potential; Radiation from moving and accelerated charge.	Unit 2: Linear and circular acceleration; Angular distribution of power radiated.	Revision & problem-solving session on Unit 2.	Assignment 2 & internal assessment.
October	Unit 3: Radiative reaction force; Scattering and absorption of radiation.	Unit 3: Thompson and Rayleigh scattering; Normal and anomalous dispersion.	Unit 3: Ionosphere and propagation of electromagnetic waves through it.	Unit 3: Reflection of EM waves by ionosphere; Motion of charged particles in uniform E & B fields.	Unit 3: Time-varying fields; Numerical problems & revision.
November	Unit 4: Fields at conductor surfaces; Waveguides; Modes in	Unit 4: Attenuation in waveguides; Dielectric waveguides;	Unit 4: Transmission line equations; Characteristic impedance	Unit 4: Low loss RF and UHF transmission lines;	Assignment 3; Comprehensive test and course wrap-

rectangular
waveguides.

Circuit
representation
of
transmission
lines.

and
propagation
coefficient.

Revision
session.

up.

TEACHING PLAN 2025-2026 (ODD SEMESTER)

(July 2025 to November 2025)

Name : SHRUTI VERMA

Department: Physics

Sub:-M.Sc. Physics 1st Sem

Month	1st Week	2nd Week	3rd Week	4th Week	
July			Introduction to Syllabus and course of Masters in Physics	General formalism of Quantum Mechanics: States and operators; Representation of States and dynamical variables; Linear vector space;	
August	Bra Ket notation, Linear operators; Orthonormal set of vectors, Completeness relation; Hermitian operators, their eigenvalues 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; 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 L^2	

September	spherical harmonics; Commutation relations among L_x L_y L_z ; Rotational symmetry and conservation of angular momentum; Eigenvalues of J^2 and J_z and their matrix representation;	Pauli spin matrices; Addition of angular momentum Assignment 1 given as homework	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	
October	Perturbation Theory: Time independent perturbation theory; Non degenerate case, the energies	wave functions in first order the energy in second order; Anharmonic perturbations of the form x^3 and x^4	Diwali break	Degenerate perturbation theory; Stark effect of the first excited state of hydrogen.	
November	Assignment 2 given + Test was conducted	Revision	Revision of full syllabus		

TEACHING PLAN 2025-2026 (ODD SEMESTER)
(July 2025 to Nov. 2026)

Name: Dr Sarita Tyagi

Department: Physics

Subject: Elements of Modern Physics (Minor) (3rd Semester)-25PHY403MI01

Month	1st Week	2nd Week	3rd Week	4th Week
July			Introduction to Planck's quantum hypothesis and the concept of photons.	Photoelectric effect: Qualitative explanation and applications. Compton scattering: Basic understanding
August	De Broglie wavelength & matter waves, Davisson-Germer experiment: Experimental verification of matter waves	Revision, Test, Limitations of Rutherford's model: Atomic instability and discrete spectra	Bohr's quantization rule & energy levels of H-like atoms (qualitative only). Wave-particle duality	Heisenberg uncertainty principle: Simple examples and applications. Energy-time uncertainty principle
September	Assignment, Two-slit interference experiment with photons and particles, Intro to Schrödinger equation,	Physical interpretation of the wave-function & probability concepts. 1-D infinitely rigid box	Energy levels & relevance in quantum dots. Tunnelling effect, Step pot. (qualitative only) & applications	Basic structure of the nucleus: Size, atomic weight, and binding energy
October	Test, 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	Assignments & Revision	Energy generation, mass deficit, and thermonuclear reactions
November	Applications of nuclear energy: Brief on nuclear reactors and their principles	Revision & Test	Revision	

Teacher Signature

TEACHING PLAN 2025-2026 (ODD SEMESTER)
(July 2025 to Nov. 2026)

Name: Dr Sarita Tyagi

Department: Physics

Subject: Elements of Modern Physics (Minor) (3rd Semester)-25PHY403MI01

Month	1st Week	2nd Week	3rd Week	4th Week
July			Introduction to Planck's quantum hypothesis and the concept of photons.	Photoelectric effect: Qualitative explanation and applications. Compton scattering: Basic understanding
August	De Broglie wavelength & matter waves, Davisson-Germer experiment: Experimental verification of matter waves	Revision, Test, Limitations of Rutherford's model: Atomic instability and discrete spectra	Bohr's quantization rule & energy levels of H-like atoms (qualitative only). Wave-particle duality	Heisenberg uncertainty principle: Simple examples and applications. Energy-time uncertainty principle
September	Assignment, Two-slit interference experiment with photons and particles, Intro to Schrödinger equation,	Physical interpretation of the wave-function & probability concepts. 1-D infinitely rigid box	Energy levels & relevance in quantum dots. Tunnelling effect, Step pot. (qualitative only) & applications	Basic structure of the nucleus: Size, atomic weight, and binding energy
October	Test, 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	Assignments & Revision	Energy generation, mass deficit, and thermonuclear reactions
November	Applications of nuclear energy: Brief on nuclear reactors and their principles	Revision & Test	Revision	

Teacher Signature

TEACHING PLAN 2025-2026 (ODD SEMESTER)
(July 2025 to Nov. 2026)

Name: Dr Sarita Tyagi

Department: Physics

Subject: Mathematical Physics (1st Semester)-24PHY201DS01

Month	1st Week	2nd Week	3rd Week	4th Week
July				Integral transform, Laplace transform
August	Properties of Laplace transforms (LT) such as first and second shifting property, LT of Periodic Functions, LT of derivatives, LT of integrals, Inverse LT by partial fractions method, Fourier series	Evaluation of coefficients of Fourier series, Cosine and Sine series, Applications of Fourier Series, Test	Fourier Transforms (FT), Fourier sine Transforms, Fourier cosine Transforms, FT of derivatives, Applications of FT	2nd order lin diff eqn with variable coefficients, Ordinary point, Singular point, Series soln around an ordinary point, Series soln around a regular singular point; the method of Frobenius,
September	Wronskian and getting a second solution, Solution of Legendre's & Bessel's equations	Solutions of Laguerre & Hermite's equations, Special functions, Generating functions (GF) for Bessel function of integral order $J_n(x)$, RR,	Integral representation; Legendre polynomials $P_n(x)$, GFs for $P_n(x)$, Recurrence relations, orthogonality, Rodrigue's Relation	Hermite Polynomials; Generating functions, Rodrigue's relation & orthogonality for Hermite polynomials; Laguerre polynomials; GF and RR
October	Orthogonality, Rodrigue's Relation, The Gamma Function, The Dirac – Delta Function, Test	Vector spaces, Norm of a Vector, Lin dep & ind, Basis & dimnsn, Isomorphism of Vector spaces, Scalar/Inner product of vectors, Orthonormal basis,	Assignments & Revision	Gram-Schmidt Orthogonalization process, Linear op, Matrices, CayleyHamilton Theorem, Inverse of matrix, Orthogonal, Unitary & Hermitian matrices,
November	Eigenvalues and eigenvectors of mat, Sim transformtn, Mat diagonalization, Simultaneous diagonalization & commutativity	Revision & Test	Revision	Revision

Teacher Signature

TEACHING PLAN 2025-2026 (ODD SEMESTER)
(July 2025 to Nov. 2025)

Name: Dr Sarita Tyagi
Subject: Optics

Department: Physics

Month	1st Week	2nd Week	3rd Week	4th Week
July			Introduction to optics, Interference by division of wavefront, Fresnel's biprism and its applications, Lloyd's Mirror, phase change on reflection	Textbook questions, Colour of thin films, wedge-shaped film, Newton's ring, Fresnel's half-period zone
August	Zone plate, Diffraction at a straight edge, rectangular slit and circular aperture	Revision, assignment, and test, one slit diffraction, two slit diffraction, N-slit diffraction	Plane transmission grating spectrum, Dispersive power of a grating, Limit of resolution	Rayleigh's criterion, Resolving power of a telescope and a grating, Textbook questions, Numerical, written test, discussion
September	Polarization and double refraction, polarization by reflection, Polarization by scattering, Malus law, double refraction	Huygen's wave theory of double refraction (Normal and oblique incidence), Nicol prism	quarter-wave plate, half-wave plate, Production & detection of PPL, Numerical	CPL, EPL, optical activity, Fresnel's theory of rotation, Specific rotation, Polarimeters (half shade and bi-quartz)
October	Basic concepts of absorption and emission of radiations, amplification, and population inversion, main components of lasers, properties of lasers	Metastable state, excitation mechanism, types of lasers (He-Ne Laser & Ruby Laser), Applications of lasers	Assignments and revision	Optical fibres and their properties, principal of light propagation through an optical fibre, acceptance angle, numerical aperture
November	Types, advantages and disadvantages of optical fibres, Numerical and textbook questions,	Syllabus revision	Syllabus revision	

Teacher Signature

TEACHING PLAN 2025-2026 (ODD SEMESTER)

(July 2025 to November 2025)

Name : SHRUTI VERMA

Department: Physics

Sub:- B.Sc. SEC Physics 3rd Sem

Month	1st Week	2nd Week	3rd Week	4th Week	
July			Introduction to SEC Physics Subject	Introduction: Measuring units. conversion to SI and CGS. Familiarization with meter scale, Vernier calliper, Screw gauge and their utility.	
August	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.	Assignment 1 given As homework (holiday in this week for this class)	Electrical and Electronic Skill: 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	

September	Maximum Power Transfer Theorem. Assignment 2 given as homework	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: 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).	
October	Cathode Ray Oscilloscope (C.R.O.): 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. 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.	Diwali break	Measurement of voltage, frequency, and phase difference. Observation of waveforms: Sine, square, and triangular waves. Troubleshooting electrical circuits.	
November	Revision	Revision of full syllabus			