

LESSON PLAN

Name :- Sandeep Sharma

Class :- BSc (Physical Science) DSC Physics First Sem

Session :-

Subject :- Mechanics and Theory of Relativity (24PHYM401DS01)

Semester – I

Weeks	Syllabus
1	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,
2	Centre of Mass and equation of motion, Constrained Motion. Work and Kinetic Energy Theorem. Conservative and neoconservative forces. Potential Energy.
3	Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy.
4	Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.
5	Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity,
6	Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
7	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle,
8	Linear Harmonic oscillator, Simple pendulum, Atwood's machine
9	Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof.
10	Moment of inertia of solid sphere, hollow sphere, spherical shell
11	solid cylinder, hollow cylinder and solid bar of rectangular cross-section.
12	Acceleration of a body rolling down on an inclined plane. Kinetic energy of rotation. Motion involving both translation and rotation.
13	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.
14	Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction.
15	Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles.
16	Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector.

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26
Program: B.Sc. (Physics Science)
Semester: I

Name of Asstt./Assoc. Prof : Dr. Seema Bisla
Course Name: Mechanics
Course Code: 24PHYS401DS01

WEEKS	SYLLABUS
Week 1	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,
Week 2	Centre of Mass and equation of motion, Constrained Motion. Work and Kinetic Energy Theorem. Conservative and non-conservative forces.
Week 3	Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy.
Week 4	Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.
Week 5	Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity,
Week 6	Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
Week 7	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle,
Week 8	Linear Harmonic oscillator, Simple pendulum, Atwood's machine.
Week 9	Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof.
Week 10	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section.
Week 11	Acceleration of a body rolling down on an inclined plane. Fly wheel,
Week 12	Torsion pendulum. Kinetic energy of rotation. Motion involving both translation and rotation.
Week 13	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.
Week 14	Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation.
Week 15	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.
Week 16	Revision

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26
Program: BCA (Physics)MDC
Semester: 111

Name of Asstt./Assoc. Prof : Dr. Seema Bisla
Course Name: Physics Fundamentals – III
Course Code: 25PHYX03MD01

WEEKS	SYLLABUS
Week 1	Electric charge: Properties of charge, comparison of charge and mass, conservation of charge, Quantization of charge, Coulomb's law, Coulomb's law in vector form, Force on a point charge due to multiple charges, Electric field intensity,
Week 2	Electric field due to an isolated point charge, uniformly charged long thin wire and charged ring, Electric dipole and dipole moment. Electric intensity on axial line and equatorial line of an electric dipole, Electric field lines, Electric flux, Gauss's law,
Week 3	Derivation of Coulomb's law from Gauss's law. Capacitance, Capacitance of an isolated spherical conductor, Capacitor and its principle,
Week 4	Capacitance of a parallel plate capacitor, Combination of the capacitor, energy stored in a charged capacitor
Week 5	Electric current, Charge carriers in different materials, Ohm's law, resistivity and conductivity. Resistors, types of resistors,
Week 6	Classification of materials based on resistivity, temperature dependence of resistivity, Superconductivity, Combination of resistors, Cell and Battery,
Week 7	the electromotive force of a cell, the internal resistance of a cell, Grouping of cells. Measurement of electric current,
Week 8	Kirchoff's rules, electric energy, electric power, Joules's law of heating, electrical power transmission, electric fuse.
Week 9	Magnetic field due to current, motion of a charged particle in a magnetic field, Lorentz force, cyclotron, force on a current carrying conductor in a magnetic field, Torque on a rectangular current loop in a uniform magnetic field,
Week 10	Biot-Savart law and its applications, Ampere's circuital law and its applications, Coulomb's law of force between two magnetic poles, Magnetic field lines and magnetic flux, Gauss's law in magnetism, Magnetic dipole
Week 11	Dipole moment, Magnetic field at a point an axial line and equatorial line of a bar magnet, Torque on a bar magnetic in uniform magnetic field.
Week 12	Time period of vibration of a freely suspended magnet in a uniform magnetic field, The earth magnetism, Classification of magnetic materials, Hysteresis, Permanent magnets and electromagnets.
Week 13	Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light, Experimental study of photoelectric effect, Matter waves-wave nature of particles, de-Broglie relation, Alpha-particle scattering experiment;
Week 14	Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, Energy bands in conductors, semiconductors and insulators.
Week 15	Intrinsic and extrinsic semiconductors- p and n type, p-n junction, Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.
Week 16	Revision

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26

Name of Asstt./Assoc. Prof : Dr. Seema Bisla

Program: B.Sc. (Physical Sciences) Course Name: Electrical Circuit & Instrumentation Skills

Semester: I

Course Code: 24PHY401SE01

WEEKS	SYLLABUS
Week 1	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.
Week 2	Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.
Week 3	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.
Week 4	Amplifier- rectifier, and rectifier- amplifier. Block diagram ac milli-voltmeter, specifications and their significance.
Week 5	Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment)
Week 6	Brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.
Week 7	Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace.
Week 8	Introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.
Week 9	Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter.
Week 10	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
Week 11	Time- base stability, accuracy and resolution. Voltmeter. Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval.
Week 12	Frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.
Week 13	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:
Week 14	DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Single-phase, three-phase & DC motors.
Week 15	Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.
Week 16	Revision

LESSON PLAN
Session: 2025-26

Name of Teacher- REENA
Class-BSc 3 year 5 semester
Subject- Solid State Physics

WEEKS	SYLLABUS
Week1	Crystalline and galssy forms ,liquid crystals
Week2	Crystal structure ,periodicity ,lattice and basis,crystal translation vectors
Week3	Unit cell,symmetry operation for two dimensional crystal
Week4	Bravais lattice in two –three dimensions
Week5	Introduction about reflection,refraction,matrix
Week6	Magnification,system matrix for a thick lens,numericals
Week7	Unitplanes,nodalplanes,lens formula,system of thin lenses
Week8	Introduction to aberration types,chromatic aberration
Week9	Achromatic doublet,achromatic combination,monochromatic aberration
Week10	Coma,astigmatism,distortion,class test
Week11	Introduction to transverse waves,speed of longitudinal waves in fluid,superposition of waves
Week12	Fourier theorm ,fourier series,fourier coefficients,dirichlet conditions
Week13	Fourier series function for different limits,even and odd functions
Week14	Fourier series for even and odd functions ,cosine series,sine series
Week15	Examples of fourier series
Week16	Parseval' identity,fourier integrals,fourier transforms

LESSON PLAN
Session: 2025-26

Name of Teacher- REENA
Class-BSc 2 year 3rd semester
Subject- OPTICS

WEE KS	SYLLABUS
Week1	Introduction to Interference, Coherent sources, wave front
Week2	YDSE, fresnel biprism, numerical problems, class test, Thickness of thin sheet
Week3	Stokes law, interference by plane parallel thin film, wedge shape film
Week4	Newton rings
Week5	Fresnel diffraction, assumption, rectilinear propagation of light
Week6	Diffraction at straight edge, rectangular slit, circular aperture
Week7	Grating, dispersive power, limit of resolution, Rayleigh criterion, resolving power
Week8	Polarization by reflection, refraction, scattering, malus law
Week9	Double refraction, nicol prism
Week10	Quarter and half plate, plane, circular, elliptical polarized light
Week11	Optical activity, optical rotation, specific rotation, polarimeters
Week12	Basics of laser, main component of laser, properties of laser
Week13	Resonator, coherence types and application of laser
Week14	Optical fiber, properties
Week15	Light propagation of light through laser, acceptance angle and numerical aperture
Week16	Types of optical fiber, single mode and multimode fibers, advantages and disadvantages of optical fibers

LESSON PLAN
Session: 2025-26 (ODD SEM)

Name of Teacher- Prince Kumar

Class- B.sc Physics (H) 5th semester

Subject- Physics of Materials (PHY-504)

WEE KS	SYLLABUS
Week 1	Amorphous and crystalline materials, Lattice translation vectors.
Week 2	Lattice with a basis- central and non-central elements. Unit cell, reciprocal lattice
Week 3	Types of lattices
Week 4	Crystal diffraction : Bragg's law, diffraction of X-rays, atoms and geometrical structure factor.
Week 5	S-ray diffraction methods – measurement of lattice parameter for cubic lattices
Week 6	Lattice vibrations. Linear monoatomic and diatomic chains.
Week 7	Acoustical and optical phonons.
Week 8	Qualitative description of the phonon spectrum in solid Brillouin zones
Week 9	Einstein and Debye theories of specific heat of solids T ³ law
Week 10	Magnetic Properties of Matter
Week 11	Response of substances of magnetic field Dia, para and ferri and ferromagnetic materials
Week 12	Classical Langevin theory of dia and paramagnetic domains.
Week 13	Quantum mechanical treatment of paramagnetism
Week 14	Curle's law, Weiss's theory of ferromagnetism and ferromagnetic domains
Week 15	Discussion of B.H hysteresis.
Week 16	Qualitative discussion of ferrimagnets and ferrites.

LESSON PLAN
Session: 2025-26 (ODD SEM)

Name of Teacher- Prince Kumar

Class- B.sc Physics (H) 5th semester

Subject- Mathematical Physics (PHY-501)

WEE KS	SYLLABUS
Week 1	Introduction to groups, rings and fields.
Week 2	Vector spaces and subspaces. Linear independence-basis and dimensions.
Week 3	Linear transformations
Week 4	Algebra of linear transformations.
Week 5	Non-singular transformations. Isomorphism.
Week 6	Representation of linear transformations by matrices
Week 7	Matrix algebra: Addition and multiplication null and unit matrices.
Week 8	Singular and non- singular matrices
Week 9	Inverse of a matrix Eigenvalues and eigenvectors
Week 10	Digitalization solution of coupled linear ordinary differential equations
Week 11	Hermitian and skew symmetric and antisymmetric
Week 12	Orthogonal and unitary matrices
Week 13	Transformations and bilinear and quadratic forms
Week 14	Trace of a matrix Cayley-Hamilton theorem
Week 15	Function of a matrix.
Week 16	Metric spaces: Inner product and metric concept.

LESSON PLAN
Session: 2025-26 (ODD SEM)

Name of Teacher- Prince Kumar

Class- B.sc Physics (H) 3rd semester

Subject- Element of Modern Physics (25PHY403MI01)

WEE KS	SYLLABUS
Week 1	Planck's quantum hypothesis and the concept of photons
Week 2	Photoelectric effect: Qualitative explanation and applications. Compton scattering: Basic understanding.
Week 3	De Broglie wavelength and matter waves, Davisson-Germer experiment
Week 4	Experimental verification of matter waves
Week 5	Limitations of Rutherford's model: Atomic instability and discrete spectra.
Week 6	Bohr's quantization rule and energy levels of hydrogen-like atoms (qualitative only)
Week 7	Wave-particle duality and Heisenberg uncertainty principle
Week 8	Simple examples and applications. Energy-time uncertainty principle
Week 9	Two-slit interference experiment with photons and particles,
Week 10	Introduction to Schrödinger equation, Physical interpretation of the wave-function and probability concepts
Week 11	One-dimensional infinitely rigid box: Energy levels and relevance in quantum dots.
Week 12	Tunnelling effect, Step potential (qualitative only) and applications.
Week 13	Basic structure of the nucleus: Size, atomic weight, and binding energy.
Week 14	Radioactivity: Stability of nucleus, laws of decay, and half-life. Overview of α decay, β decay (neutrino hypothesis), and γ -ray emission.
Week 15	Introduction to nuclear fission and fusion: Energy generation, mass deficit, and thermonuclear reactions
Week 16	Applications of nuclear energy: Brief on nuclear reactors and their principles

Summary of Lesson Plan of College Faculty

Name of College: Pt. Neki Ram Sharma Government College, Rohtak **Academic Session 2025-**

26 Semester: Odd

Name of Asstt./Ass. Prof : Dr. Ajay Mann

Class: M.Sc. 3rd Semester (Physics)

Name of Subject: Computational Physics (24PHY24DB1)

August 2025 to December 2025	
1 st week Aug	Unit I Numerical Integration : Newton-cotes formulae : Trapezoidal rule,
2 nd week Aug	Simpson's 1/3 rule, error estimates in Trapezoidal rule and Simpson 1/3 rule using Richardson deferred limit approach
3 rd week Aug	Gauss-Legendre quadrature method; Monte Carlo (mean sampling) method for single, double and triple integrals.
4 th week Aug	Numerical Differentiation: Taylor Series method; Generalized numerical differentiation: truncation errors. Roots of Linear, Non-linear Algebraic and Transcendental equations:
1 st week Sept	Newton-Raphson method; convergence of solutions. Curve Fitting: Principle of least square; Linear regression; Polynomial regression; Exponential and Geometric regression, Revision, Assignment, Unit test
2 nd week Sept	Unit II Interpolation: Finite differences; Interpolation with equally spaced points; Gregory - Newton's Interpolation formula for forward and backward interpolation;
3 rd week Sept	Interpolation with unequally spaced points: Lagrangian interpolation, Solution of Simultaneous Linear Equations: Gaussian elimination method,
4 th week Sept	Pivoting; Gauss- Jordan elimination method; Matrix inversion. Eigen values and Eigen vectors: Jacobi's method for symmetric matrix. Revision, Assignment, Unit test
1 st week Oct	Unit III Numerical Solution of First Order Differential Equations:
2 nd week Oct	Numerical Solutions of Second Order Differential Equation:
3 rd week Oct	First order Taylor Series method; Euler's method; Runge-Kutta methods; Predictor corrector method; Elementary ideas of solutions of partial differential equations
4 th week Oct	Deepawali holidays
1 st week Nov	UNIT IV 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.
2 nd week Nov	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;
3 rd week Nov	Control statements; Go To statement; Arithmetic IF and logical IF statements; Initial and boundary value problems: shooting methods,
4 th week Nov	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.

LESSON PLAN
Session: 2025-26

Name of teacher- Parveen Kumar (ASSOCIATE PROFESSOR)
Section A & B
Class- B.Sc. VTH SEM
Subject- SOLID STATE PHYSICS

CLASS	WEEKS	SYLLABUS
	Week 1	Crystalline and gallssy forms, liquid crystals.
	Week 2	Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes
	Week 3	Unit cell and primitive cell, Winger Seitz primitive Cell
	Week 4	symmetry operations for a two dimensional crystal, Bravais Lattices in two and three dimensions
	Week 5	Unit-II crystal planes and Miller indices,
	Week 6	, Interplaner spacing, Crystal structures of Zinc sulphide,
	Week 7	Sodium Chloride and diamond, X-ray diffraction
	Week 8	Bragg's Law and experimental x-ray diffraction methods
	Week 9	K-space. UNIT TEST
	Week 10	Unit-III Reciprocal lattice and its physical significance, reciprocal lattice vectors
	Week 11	reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
	Week 12	Specific heat : Specific heat of solids,
	Week 13	Einstein's theory of specific heat,
	Week14	Debye model of specific heat of solids
	Week15	REVISION
	Week 16	UNIT TEST
		MDU examination
		Winter break

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26
Program: B.Sc. Chemistry Single Major
Semester: III

Name of Asstt./Assoc. Prof : Dr. Susheel Kumar
Course Name: Elements of Modern Physics
Course Code: 24PHY401MI01

WEEKS	SYLLABUS
Week 1	Foundations of Quantum Physics: Planck's quantum hypothesis and the concept of photons
Week 2	Photoelectric effect: Qualitative explanation and applications. Compton scattering: Basic understanding
Week 3	De Broglie wavelength and matter waves
Week 4	Davisson-Germer experiment: Experimental verification of matter waves
Week 5	Atomic instability and discrete spectra. Bohr's quantization rule and energy levels of hydrogen-like atoms (qualitative only)
Week 6	Wave-particle duality and Heisenberg uncertainty principle: Simple examples and applications
Week 7	Energy-time uncertainty principle.
Week 8	Basics of Quantum Mechanics: Two-slit interference experiment with photons and particles
Week 9	Introduction to Schrödinger equation, Physical interpretation of the wave-function and probability concepts
Week 10	One-dimensional infinitely rigid box: Energy levels and relevance in quantum dots. Tunnelling effect
Week 11	Step potential (qualitative only) and applications.
Week 12	Nuclear Physics and Applications: Basic structure of the nucleus: Size, atomic weight, and binding energy
Week 13	Radioactivity: Stability of nucleus, laws of decay, and half-life. Overview of α decay, β decay (neutrino hypothesis), and γ -ray emission.
Week 14	Introduction to nuclear fission and fusion: Energy generation, mass deficit, and thermonuclear reactions.
Week 15	Applications of nuclear energy: Brief on nuclear reactors and their principles.
Week 16	Revision

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26

Name of Asstt./Assoc. Prof : Ms. Himani Ghai

Program: M.Sc. Physics

Course Name: Quantum Mechanics-I

Program Code: PHY2

Course Code: 24PHY201DS03

Semester: Odd

05th Aug. 2025 to 30th November 2025	
Month (August-September)	
05th Aug. – 09th Aug.	Unit-I: General formalism of Quantum Mechanics: States and operators
11th Aug. – 16th Aug.	Representation of States and dynamical variables; Linear vector space; Bra Ket notation.
18th Aug. – 23rd Aug.	Linear operators; Orthonormal set of vectors, Completeness relation, Hermitian operators, their eigen values and eigenvectors.
25th Aug. – 30th Aug.	The fundamental commutation relation; Commutation rule and the uncertainty relation.
01st Sept. – 06th Sept.	Simultaneous eigenstates of commuting operators; The unitary transformation.
Month (September-October)	
08th Sept. – 13th Sept.	Dirac delta function; Relation between Kets and wave functions; Matrix representation of operators
15th Sept. – 20th Sept.	Solution of linear harmonic oscillator problem by operator methods, Unit-II: Angular momentum operator.
22nd Sept. – 27th Sept.	Angular momentum operators and their representation in spherical polar co-ordinates; Eigenvalues and eigenvectors of L^2 , spherical harmonics.
29th Sept. – 04th Oct.	Commutation relations among L_x , L_y , L_z ; Rotational symmetry and conservation of angular momentum, Unit-I Test.
06th Oct. – 11th Oct.	Eigenvalues of J^2 and J_z and their matrix representation; Pauli spin matrices; Addition of angular momentum, Assignment-I.
Month (October-November)	
14th Oct. – 22nd Oct.	Diwali Vacations
23rd Oct. – 25th Oct.	Unit-III: Solution of Schrodinger equation for three dimensional problems: The three-dimensional harmonic oscillator in both cartesian and spherical polar coordinates (contd.).
27th Oct. – 01st Nov.	Eigen values, Eigen functions and the degeneracy of the states, Unit-II Test.

03rd Nov. – 08th Nov.	Solution of the hydrogen atom problem, the eigenvalues, eigenfunctions and the degeneracy
10th Nov. – 15th Nov.	Assignment-II; Unit-IV: Perturbation Theory: Time independent perturbation theory, non-degenerate case, Energies, and wave functions in first order the energy in second order
17th Nov. – 22nd Nov.	Anharmonic perturbations of the form λx^3 and λx^4 , Degenerate perturbation theory, Stark effect of the first excited state of hydrogen.
24th Nov. – 29th Nov.	Sessional Examination, Revision of Unit I, II, III & IV, Doubt Clearance Session.
01st Dec. and onwards	University Examinations

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-2026

Deepak

Program: M.Sc. Physics

Program Code: PHY2

Semester: Odd

Name of Asstt./Assoc. Prof : Mr.

Course Name: Mathematical Physics

Course Code: 24PHY201DS01

05th Aug. 2025 to 30th November 2025	
Month (August-September)	
05th Aug. – 09th Aug.	Syllabus Introduction, Unit-IV: Integral transform, Laplace transform, Properties of Laplace transforms such as first and second shifting property.
11th Aug. – 16th Aug.	Laplace transform of derivatives, Laplace Transform of integrals, Laplace Transform of Periodic Functions.
18th Aug. – 23rd Aug.	Inverse Laplace Transform by partial fractions method, Applications of Laplace Transform.
25th Aug. – 30th Aug.	Fourier Transforms, Fourier sine Transforms, Fourier cosine Transforms, Fourier transform of derivatives, Applications of Fourier Transforms.
01st Sept. – 06th Sept.	Fourier series, Evaluation of coefficients of Fourier series, Cosine and Sine series, Applications of Fourier Series. Review of Unit – 4 & Unit Test;
Month (September-October)	
08th Sept. – 13th Sept.	Unit-II: Differential Equations, 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; Frobenious' method
15th Sept. – 20th Sept.	Wronskian and getting a second solution, Solution of Legendre's equation, Solution of Bessel's equation, Solutions of Laguerre and Hermite's equations.
22nd Sept. – 27th Sept.	(Unit-III): Generating functions for Bessel function of integral order $J_n(x)$, Recurrence relations, Integral representation of Bessel Functions.
29th Sept. – 04th Oct.	Legendre polynomials $P_n(x)$, Generating functions for $P_n(x)$, Recurrence relations, orthogonality, Rodrigue's Relation.
06th Oct. – 11th Oct.	Hermite Polynomials; Generating functions, Rodrigue's relation & orthogonality for Hermite polynomials.
Month (October-November)	
13th Oct.	The Gamma Function
14th Oct. – 22nd Oct.	Diwali Vacations
23rd Oct. – 25th Oct.	Dirac – Delta Function

27th Oct. – 01st Nov.	Laguerre polynomials; Generating function and Recurrence relations, Orthogonality, Rodrigue's Relation, Assignments, Unit-Test.
03rd Nov. – 08th Nov.	Unit-I: Vector spaces, Norm of a Vector, Linear independence & dependence, Basis and dimension, Isomorphism of Vector spaces, Scalar/Inner product of vectors, Orthonormal basis.
10th Nov. – 15th Nov.	Gram-Schmidt Orthogonalization process, Linear Operators, Matrices, Inverse of matrix, Orthogonal, Unitary and Hermitian matrices,
17th Nov. – 22nd Nov.	Cayley-Hamilton Theorem, Eigen-values and eigenvectors of matrices, Similarity transformation, Matrix diagonalization, Simultaneous diagonalization and commutativity.
24th Nov. – 29th Nov.	Sessional Examination, Revision of Unit I, II, III & IV, Doubt Clearance Session.
01st Dec. and onwards	University Examinations

Name of the Teacher : Dr. Anand Kumar
Class and Section: M.Sc. (Physics) First Year (2025-26) Semester 1
Subject: Physics
Name of Paper: Physics of Electronic Devices Paper Code: 24PHY201DS04
Lesson Plan
August 2025
Week 2 Charge carriers in semiconductors: Energy bands, metals, Semiconductors and insulators, Direct and indirect band gap semiconductors
Week 3 Variation of energy bands with alloy composition, Electrons and holes, effective mass, Intrinsic and extrinsic semiconductors, Concept of Fermi level
Week 4 Electron and hole concentration at equilibrium, Temperature dependence of carrier concentrations, Compensation and space charge neutrality
September 2025
Week 1 Conductivity and mobility, Effect of temperature and doping on mobility, Hall effect, Invariance of Fermi level
Week 2 Carrier transport in semiconductors: Optical absorption and luminescence, Carrier lifetime and photoconductivity
Week 3 Direct/indirect recombination of electrons and holes, Traps and defects, Steady state carrier generation, Quasi Fermi levels

Week 4 Diffusion and drift of carriers, Diffusion and recombination, Diffusion length
October 2025
Week 1 Haynes Shockley experiment, Gradient in quasi Fermi level, External and internal photoelectric effect
Week 2 Diode physics and optoelectronic devices: P-N junction diode: Basic structure, Energy band diagram, Built-in potential, Electric field
Week 3 Space charge width and qualitative description of current flow, Derivation of diode current equation, Zener diode: breakdown mechanisms, Voltage regulator circuit, Power diode
Week 4 Varactor diode, Optoelectronic devices: Vacuum photodiode, Photo-multipliers tube, P-N junction photodiode, Pin photodiode, Avalanche photodiode
November 2025
Week 1 Phototransistor, Solar cell, Light emitting diode (LED), Diode laser: Condition for laser action and optical gain
Week 2 Transistors: Bipolar junction transistor (BJT), Transistor operating modes, Transistor action, Transistor biasing configurations and characteristics
Week 3 Field effect transistors: Junction field effect transistor (JFET), Metal oxide semiconductor field effect transistor (MOSFET)
Week 4 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.
December 2025
Week 1 Revision
Week 2 Revision
Week 3 Revision
Week 4 Revision

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26
Program: B.Sc. (Physical Sciences)
Semester: I

Name of Asstt./Assoc. Prof : Dr. Ajay Kumar
Course Name: Physics Fundamentals - I
Course Code: 24PHYX01MD01

Weeks	Syllabus
Week 1	Unit 1: Mechanics: Every day activities related to Force, weight,
Week 2	work, energy, power and centrifuge;
Week 3	washing machine.
Week 4	Revision of the unit and test
Week 5	Unit 2: Heat: Variation of boiling point with pressure, pressure cooker
Week 6	cooling by expansion, refrigerator, air conditioner,
Week 7	Bernoulli principle, Bunsen burner, aero-plane
Week 8	Revision of the unit and test
Week 9	Unit 3: Sound and Optics: Sound waves, Doppler Effect, power of lens, long sight and short sight
Week 10	microscope, telescope,
Week 11	binocular camera, video camera.
Week 12	Revision of the unit and test
Week 13	Unit 4: Electrical and Electronic Appliances: Working of the tube light and fan
Week 14	kilowatt hour, fuse and heating elements,
Week 15	microwave oven, electric heater, photoelectric effect
Week 16	Revision of the unit and test

Summary of Lesson Plan of College Faculty
Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26

Name of Asstt./Assoc. Prof : Dr. Ajay Kumar

Program: B.Sc. (Physical Sciences)

Course Name: Mechanics and Theory of Relativity

Semester: I

Course Code: 24PHYM401DS01

Weeks	Syllabus
Week 1	Unit 1: Basics of Mechanics: Mechanics of single and system of particles, Conservation law of linear momentum
Week 2	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.
Week 3	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.
Week 4	Revision and test
Week 5	Unit 2: Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations,
Week 6	Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
Week 7	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator, Simple pendulum, Atwood's machine
Week 8	Revision and test
Week 9	Unit 3: Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum,
Week 10	kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof. Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder,
Week 11	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.
Week 12	Revision and test
Week 13	Unit 4: Special Theory of Relativity: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force.
Week 14	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.
Week 15	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.
Week 16	Revision and test

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Pt. Neki Ram Sharma Government College, Rohtak

Academic Session: 2025-26
Program: B.Sc. (Physical Sciences)
Semester: I

Name of Asstt./Assoc. Prof : Dr. Ajay Kumar
Course Name: Physics in Everyday Life
Course Code: 24PHY401MI01

Weeks	Syllabus
Week 1	Unit 1: Mechanics: Every day activities related to Force, weight,
Week 2	work, energy, power and centrifuge;
Week 3	washing machine.
Week 4	Revision of the unit and test
Week 5	Unit 2: Heat: Variation of boiling point with pressure, pressure cooker
Week 6	cooling by expansion, refrigerator, air conditioner,
Week 7	Bernoulli principle, Bunsen burner, aero-plane
Week 8	Revision of the unit and test
Week 9	Unit 3: Sound and Optics: Sound waves, Doppler Effect, power of lens, long sight and short sight
Week 10	microscope, telescope,
Week 11	binocular camera, video camera.
Week 12	Revision of the unit and test
Week 13	Unit 4: Electrical and Electronic Appliances: Working of the tube light and fan
Week 14	kilowatt hour, fuse and heating elements,
Week 15	microwave oven, electric heater, photoelectric effect
Week 16	Revision of the unit and test