

Name of the Teacher : Dr. Anand Kumar
Class and Section: M.Sc. (Physics) First Year (2024-25) Semester 1
Subject: Physics
Name of Paper: Physics of Electronic Devices Paper Code: 24PHY201DS04
Lesson Plan
August 2024
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 2024
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 2024
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 2024

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

December 2024

Week 1

p-n-p-n devices and their characteristics, Silicon controlled rectifier and switch and their characteristics.

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: 2024-25

Program: M.Sc. Physics

Program Code: PHY2

Semester: Odd

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

Course Name: Quantum Mechanics-I

Course Code: 24PHY201DS03

01st Aug. 2024 to 30th November 2024	
Month (August-September)	
01st Aug. – 03rd Aug.	Unit-I: General formalism of Quantum Mechanics: States and operators
05th Aug. – 10th Aug.	Representation of States and dynamical variables; Linear vector space; Bra Ket notation
12th Aug. – 17th Aug.	Linear operators; Orthonormal set of vectors, Completeness relation, Hermitian operators, their eigenvalues and eigenvectors
19th Aug. – 24th Aug.	The fundamental commutation relation; Commutation rule and the uncertainty relation
26th Aug. – 31st Aug.	Simultaneous eigenstates of commuting operators; The unitary transformation
02nd Sept. – 07th Sept.	Dirac delta function; Relation between kets and wave functions; Matrix representation of operators
Month (September-October)	
09th Sept. – 14th Sept.	Solution of linear harmonic oscillator problem by operator methods, Unit-II: Angular momentum operator
16th Sept. – 21st Sept.	Angular momentum operators and their representation in spherical polar co-ordinates; Eigenvalues and eigenvectors of L^2 , spherical harmonics
23rd Sept. – 28th Sept.	Commutation relations among L_x , L_y , L_z ; Rotational symmetry and conservation of angular momentum, Unit-I Test
30th Sept. – 05th Oct.	Eigenvalues of J^2 and J_z and their matrix representation; Pauli spin matrices; Addition of angular momentum, Assignment-I
07th Oct. – 12th Oct.	Unit-III: Solution of Schrodinger equation for three dimensional problems: The three-dimensional harmonic oscillator in both cartesian and spherical polar coordinates (contd.)
Month (October-November)	
14th Oct. – 19th Oct.	Eigen values, Eigen functions and the degeneracy of the states, Unit-II Test
21st Oct. – 26th Oct.	Solution of the hydrogen atom problem, the eigenvalues, eigenfunctions and the degeneracy
28th Oct. – 02nd Nov.	Diwali Vacations,
04th Nov. – 09th 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
11th Nov. – 16th Nov.	Anharmonic perturbations of the form λx^3 and λx^4 , Degenerate perturbation theory
18th Nov. – 23rd Nov.	Stark effect of the first excited state of hydrogen, Sessional Exam/ Internal Assessment Test
25th Nov. – 30th Nov.	Revision of Unit I, II, III & IV, Doubt Clearance Session.
02nd Dec. and onwards	University Examinations

LESSON PLAN
Session: 2024-25 (ODD SEM)

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

WEEKS	SYLLABUS
Week1	Introduction to Interference,Coherent sources
Week2	Fringe width,fresnel biprism,numerical problems,class test
Week3	Thickness of thin sheet,lloyd mirror,comparison of both
Week4	Stokes law,numerical problems,class test
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 theorem ,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- B.Sc 1st SEMESTER
Session: 2024-25

Name of teacher- Seema Bisla
Class- Bachelor of Science in Physical Sciences
Subject- Discipline Specific Courses

CLASS	WEEKS	SYLLABUS
B.Sc 3 rd Semester	22-7-2024 to 27-7-2024	Unit 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,
	29-7-2024 to 3-8-2024	Centre of Mass and equation of motion, Constrained Motion. Work and Kinetic Energy Theorem.
	5-8-2024 to 10-8-2024	Conservative and neoconservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium
	12-8-2024 to 17-8-2024	Elastic potential energy. Force as gradient of potential energy.
	20-8-2024 to 24-8-2024	Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy.
	27-8-2024 to 31-8-2024	Unit 2: Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential,
	2-9-2024 to 7-9-2024	Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
	9-9-2024 to 14-9-2024	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator, Simple pendulum, Atwood's machine
	16-9-2024 to 21-9-2024	Unit 3: Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum,
	23-9-2024 to 28-9-2024	kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof. Moment of inertia of solid sphere, hollow sphere,
	30-9-2024 to 5-10-2024	spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section. Acceleration of a body rolling down on an inclined plane.

	7-10-2024 to 12-10-2024	Kinetic energy of rotation. Motion involving both translation and rotation.
	14-10-2024 to 19-10-2024	Unit 4: Special Theory of Relativity: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Variation of mass with velocity.
	21-10-2024 to 26-10-2024	Centrifugal force. Coriolis force and its applications. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations.
	4-11-2024 to 9-11-2024	Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities.
	11-11-2024 to 20-11-2024	Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector.
	23-11-2024 to 20-12-2024	MDU examination
	21-12-2024 to 31-12-2024	Winter break

LESSON PLAN- B.Sc 5th SEMESTER
Session: 2024-25

Name of teacher- Seema Bisla
 Class- BSc-5th Sem
 Subject- SOLID STATE PHYSICS

CLASS	WEEKS	SYLLABUS
B.Sc 3 rd Semester	22-7-2024 to 27-7-2024	Unit 1: .Crystalline and gallyssy forms, liquid crystals.
	29-7-2024 to 3-8-2024	Crystal structure, periodicity, lattice and basis
	5-8-2024 to 10-8-2024	crystal translational vectors and axes. Unit cell and primitive cell,
	12-8-2024 to 17-8-2024	Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal,
	20-8-2024 t 24-8-2024	Bravais tattices in two and three dimensions.
	27-8-2024 to 31-8-2024	Unit 2: Unit-II crystal planes and Miller indices, Interplanner spacing,
	2-9-2024 to 7-9-2024	Crystal structures of Zinc sulphide, Sodium Chloride and diamond, X-ray diffraction,
	9-9-2024 to 14-9-2024	Bragg's Law and experimental x-ray diffraction methods, K-space.
	16-9-2024 to 21-9-2024	Unit 3: .Reciprocal lattice and its physical significance, reciprocal lattice vectors,
	23-9-2024 to 28-9-2024	reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
	30-9-2024 to 5-10-2024	Specific heat : Specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids.
	7-10-2024 to 12-10-2024	Test,
	14-10-2024 to 19-10-2024	Revision

	21-10-2024 to 26-10-2024	Assignments
	4-11-2024 to 9-11-2024	Viva.
	11-11-2024 to 20-11-2024	Test, Revision, Assignments, Viva.
	23-11-2024 to 20-12-2024	MDU examination
	21-12-2024 to 31-12-2024	Winter break

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- DR. MANJU

Class- M.Sc Physics Semester III Paper XVI

Subject- Electrodynamics and Wave propagation 19PHY23C2

WEEKS	SYLLABUS
Week 1	Review of four-vector and Lorentz transformation in four dimensional space
Week 2	Conservation of charge and four current density; Electromagnetic field tensor in four dimensions and Maxwell's equations
Week 3	Lorentz invariants of electromagnetic fields; Dual field tensor
Week 4	Transformation of electric and magnetic field vectors; Covariance of force equation
Week 5	Radiating systems: Field and radiation of a localized source; Oscillating electric dipole; Centre fed linear antenna;
Week 6	Lienard-Wiechert potential
Week 7	Electric and magnetic fields due to a uniformly moving charge and accelerated charge
Week 8	Linear and circular acceleration and angular distribution of power radiated.
Week 9	Radiative reaction force; Thompson scattering, Scattering and absorption of radiation;
Week 10	Rayleigh scattering; Normal and anomalous dispersion; Ionosphere; Propagation of electromagnetic wave through ionosphere
Week 11	Reflection of electromagnetic waves by ionosphere; Motion of charged particles in uniform E and B fields; Time varying fields
Week 12	Fields at the surface of and within a conductor; Wave guides; Modes in a rectangular wave guide.
Week 13	Dielectric wave guides
Week 14	parallel plate transmission lines
Week 15	Transmission line equations and their solutions & Characteristic
Week 16	Attenuation in wave guides; impedance and propagation coefficient; Low loss radio frequency and UHF transmission

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- Jasbir Singh

Class- M.Sc. Physics 3rd semester

Subject- Nuclear and Particle Physics 23PHY23C1

WEEKS	SYLLABUS
Week 1	Two nucleon problem: Common potentials used for calculation of nuclear forces viz. Wigner, Majorana, Bartlett and Heisenberg potentials, Quiz
Week 2	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, Quiz
Week 3	Meson theory of nuclear force (Qualitative discussion); Types of nuclear reactions: compound and direct nuclear reactions, Group discussion
Week 4	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. Test and Assignment
Week 5	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), Quiz
Week 6	Stability limits against spontaneous fission, Merits and limitations of Liquid drop model; Shell model: Experiment evidences for shell effect. Quiz
Week 7	Magic numbers, Main assumptions of the single particle shell model, Spin-orbit coupling in single particle shell model, Group discussion
Week 8	Estimation of spin, parities and magnetic moments of nuclei by single particle shell model. Test and Assignment
Week 9	Nuclear Decays: Alpha (α) decay, α - disintegration energy, Range of α -particles, Range – energy relationship for α -particles and Geiger – Nuttall law, Quiz
Week 10	Beta decay, Pauli's neutrino hypothesis, Fermi theory of beta decay, Curie plot, selection rules for beta decay, Fermi and Gamow-Teller Transitions, Group discussion
Week 11	Detection and properties of neutrino; Gamma decay, Multipole transitions in nuclei, Quiz
Week 12	Angular momentum and parity selection rules; Internal conversion, Nuclear isomerism. Test and Assignment
Week 13	Elementary Particle Physics: Classifications of elementary particles: fermions and bosons, particles and antiparticles; Quiz

Week 14	Fundamental interactions in nature; Type of interaction between elementary particles: Symmetry and conservation laws; Classification of hadrons: Strangeness, Hypercharge, Gellman - Nishijima formula,
Week 15	Elementary ideas of CP and CPT invariance; Quark model, Baryon Octet, Meson Octet, Baryon Decuplet, Group discussion
Week 16	Gell-Mann-Okubo formula for octet and decuplet, the necessity of introducing the colour quantum number, SU (2) and SU (3) multiples (qualitative only). Test and Assignment

LESSON PLAN
Session: 2024-25

Name of teacher- Parveen Kumar (ASSOCIATE PROFESSOR)

Class- B.Sc. VTH SEM

Subject- SOLID STATE PHYSICS

CLASS	WEEKS	SYLLABUS
	22-7-2024 to 27-7-2024	Crystalline and gally forms, liquid crystals.
	29-7-2024 to 3-8-2024	Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes
	5-8-2024 to 10-8-2024	Unit cell and primitive cell, Winger Seitz primitive Cell
	12-8-2024 to 17-8-2024	symmetry operations for a two dimensional crystal, Bravais Lattices in two and three dimensions
	20-8-2024 t 24-8-2024	Unit-II crystal planes and Miller indices,
	27-8-2024 to 31-8-2024	, Interplaner spacing, Crystal structures of Zinc sulphide,
	2-9-2024 to 7-9-2024	Sodium Chloride and diamond, X-ray diffraction
	9-9-2024 to 14-9-2024	Bragg's Law and experimental x-ray diffraction methods
	16-9-2024 to 21-9-2024	K-space. UNIT TEST
	23-9-2024 to 28-9-2024	Unit-III Reciprocal lattice and its physical significance, reciprocal lattice vectors
	30-9-2024 to 5-10-2024	reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
	7-10-2024 to 12-10-2024	Specific heat : Specific heat of solids,
	14-10-2024 to 19-10-2024	Einstein's theory of specific heat,
	21-10-2024 to 26-10-2024	Debye model of specific heat of solids
	4-11-2024 to 9-11-2024	REVISION
	11-11-2024 to 20-11-2024	UNIT TEST
	23-11-2024 to 20-12-2024	MDU examination
	21-12-2024 to 31-12-2024	Winter break

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- Dr. Seema Redhu
Class- B.sc (H) 1st semester
Subject- Basic Instrumentation Skills

WEEK	SYLLABUS
S	
Week 1	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,
Week 2	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
Week 3	Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/Multimeter and their significance. AC milli-voltmeter
Week 4	Type of AC millivolt meters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac milli-voltmeter, Specifications and their significance
Week 5	Cathode Ray Oscilloscope: 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.
Week 7	Front panel controls. Specifications of a CRO and their significance. Use of CRO for the measurement of voltage (dc and ac frequency, time period)
Week 8	Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working

Week 9	Generators and Transformers: DC Power sources. AC/DC generators.
Week 10	Inductance, capacitance, and impedance. Operation of transformers
Week 11	Electric Motors: Single-phase, three- phase & DC motors. Basic design.
Week 12	Interfacing DC or AC sources to control heaters and motors. Speed & power of ac motor.
Week 13	Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection.
Week 14	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.
Week 15	Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation.
Week 16	Solid and stranded cable. Conduit. Cable trays. Splices: wirenuts, crimps, terminal blocks, and solder. Preparation of extension board.

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- Dr. Seema Redhu

Class- B.sc (H) 3rd semester

Subject- Thermal Physics

WEEKS	SYLLABUS
Week 1	Zeroth and first law of thermodynamics. Reversible and irreversible processes
Week 2	Conversion of heat into work. Carnot theorem Second law of thermodynamics
Week 3	Thermodynamic temperature. Clausius inequality.
Week 4	Entropy, Entropy changes in reversible processes
Week 5	Entropy changes in irreversible processes
Week 6	Temperature-entropy diagrams
Week 7	The principle of increase of entropy & its applications
Week 8	Enthalpy
Week 9	Gibbs and Helmholtz functions
Week 10	Maxwell relations and their applications.
Week 11	Magnetic cooling by adiabatic demagnetization, approach to absolute zero
Week 12	change of phase, equilibrium between a liquid and its vapour.
Week 13	Clausius-Clapeyron equation
Week 14	The triple point with examples from physics
Week 15	Magnetic work.
Week 16	Second order phase transitions.

Summary of Lesson Plan of College Faculty

Name of College: **Pt. Neki Ram Sharma Government College, Rohtak** Academic Session 2024-25 Semester: **Odd**

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

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

Name of Subject: **Computational Physics (23PHY23DB1)**

August 2024 to December 2024	
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.

Name of College: Pt. Neki Ram Sharma Government College, Rohtak

Academic Session 2024-25

Semester: Odd

Name of Asstt./Ass. Prof : karmvir

Class: B.Sc. (Physics Hons.) 6th Sem.

Name of Subject: Electronics Devices : Physics and Applications-I

Paper Code: Phy-5051, Days: (5-6)

22 nd July.2024 to Nov.24	
Week 1	Mesh analysis for d.c. and a.c. circuits.
Week 2	Nodal analysis duality in networks. To Equivalent of a four terminal network.
Week 3	Thevenin and Norton theorem. Maximum power transfer, superposition and reciprocity theorems
Week 4	Z, Y, H parameters.
Week 5	Basic semiconductor physics – p and n type semiconductors, energy level diagram.
Week 6	Revision and test
Week 7	conductivity and mobility, pn junction fabrication (simple idea).
Week 8	Barrier formation in pn junction diode.
Week 9	current flow mechanism in forward and reverse biased diode (recombination, drift and saturation of drift velocity).
Week 10	Single pn junction devices (physical explanation, current voltage characteristics and one or two applications.
Week 11	Two terminal devices-rectifier diode.
Week 12	REVISION AND TEST.
Week 13	Zener diode, photo diode.
Week 14	LED, solar cell and varactor diode

Week 15	Three-terminal devices-junction field effect transistor (FET).
Week 16	unijunction transistor (UJT) and their equivalent circuits.
Week 17	Two junction devices p-n-p and n-p-n transistors, physical mechanism of current flow, active.
Week 18	Test Discussion and Assignments.
Week 19	Cut off and saturation regions.
Week 20	Transistor in active region and equivalent circuit.
Week21	REVISION AND TEST.

Name of College: Pt. Neki Ram Sharma Government College, Rohtak

Academic Session 2024-25

Semester: Odd

Name of Asstt./Ass. Prof : karmvir

Class: B.Sc. (Physics Hons.) 1st Sem.

Name of Subject: Classical Mechanics

paper Code: USPHY4, Days: (3-4)

22 st July, 2024 to Nov. 24	
Week 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.
Week 3	Conservative and non-conservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium.
Week 4	Elastic potential energy. Force as gradient of potential energy. Work & Potential energy.
Week 5	Work done by non-conservative forces. Law of conservation of Energy.
Week 6	Revision and test
Week 7	Degrees of freedom and Generalized coordinates
Week 8	Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum.
Week 9	Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.
Week 10	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle.
Week 11	Linear Harmonic oscillator, Simple pendulum, Atwood's machine.
Week 12	REVISION AND TEST.
Week 13	Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation.
Week 14	Theorems of perpendicular and parallel axes with proof. Moment of inertia of solid sphere, hollow sphere.

Week 15	Spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section.
Week 16	Acceleration of a body rolling down on an inclined plane
Week 17	Fly wheel, Torsion pendulum. Kinetic energy of rotation, Motion involving both translation and rotation.
Week 18	Test Discussion and Assignments.
Week 19	Centrifugal force. Coriolis force and its applications. Michelson-Morley Experiment and its outcome.
Week 20	Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation.
Week21	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.

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- Parveen
Class- M.Sc. Physics 1st semester
Subject- Classical Mechanics (24PHY201DS02)

WEEKS	SYLLABUS
Week 1	Unit 1: Survey of Elementary Principles and Lagrangian Formulation: Newtonian mechanics of one and many particle systems, Conservation laws
Week 2	Constraints and their classification, Generalized coordinates and momenta, Principle of virtual work, D' Alembert's principle and Lagrange's equation
Week 3	Velocity dependent potentials and dissipation function, Simple applications of Lagrangian formulation, Cyclic coordinates
Week 4	Symmetries of space and time and conservation laws, Invariance of Lagrangian under Galilean transformation . Numerical Problems Test and Assignment
Week 5	Unit 2: Moving coordinate systems and Motion in a central force field: Rotating frames, inertial forces, terrestrial applications of Coriolis force
Week 6	Two body problem: Reduction to equivalent one body problem, Central force definition and characteristics, the equation of motion and first integrals
Week 7	Differential equation for the orbit, general analysis of orbits, condition for closure and stability of circular orbits
Week 8	Kepler's laws and equations, Rutherford scattering . Numerical Problems ,Test and Assignment
Week 9	Unit 3: Legendre Transformation and Hamilton's equations of motion, Some techniques of calculus of variation, Variational principle
Week 10	Hamilton's principle from D' Alembert's principle, Lagrange's equation from Hamilton's principle, Hamilton's equations from variational principle

Week 11	Variation and end points, Principle of least action and its forms, Hamilton-Jacobi equation and their solutions, Use of Hamilton-Jacobi method for the solution of Harmonic oscillator problem
Week 12	Hamilton's principle function, Hamilton's characteristic function and their properties. Numerical Problems, Test and Assignment
Week 13	Unit 4: Canonical transformations, Generating functions, Properties of Poisson bracket, Equation of motion in Poisson bracket
Week 14	Angular momentum and Poisson bracket relations, Jacobi identity, Invariance of Poisson brackets using canonical transformations. Numerical Problems
Week 15	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,
Week 16	Theory of small oscillations, Examples of coupled oscillators: Two coupled pendulum, double pendulum, Free vibrations of a linear triatomic molecule. Test and Assignment

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

Academic Session: 2024-25
Program: M.Sc. Physics
Program Code: PHY2
Semester: Odd

Name of Asstt./Assoc. Prof : Mr. Deepak
Course Name: Mathematical Physics
Course Code: 24PHY201DS01

01st Aug. 2024 to 30th November 2024	
Month (August-September)	
01st Aug. – 03rd Aug.	Unit-IV: Integral transform, Laplace transform, Properties of Laplace transforms such as first and second shifting property, Laplace transform of derivatives.
05th Aug. – 10th Aug.	Laplace Transform of Periodic Functions Laplace Transform of integrals, Inverse Laplace Transform by partial fractions method, Fourier series, Evaluation of coefficients of Fourier series Cosine and Sine series.
12th Aug. – 17th Aug.	Applications of Fourier Series, Fourier Transforms, Fourier sine Transforms, Fourier cosine Transforms, Fourier transform of derivatives, Applications of Fourier Transforms.
19th Aug. – 24th Aug.	Review of Unit – 4 & Unit Test; Introduction to Unit-2, Differential Equations, Second order linear differential equation with variable coefficients
26th Aug. – 31st Aug.	Ordinary point, Singular point Series solution around an ordinary point, series solution around a regular singular point; Frobenius' method
02nd Sept. – 07th Sept.	Wronskian and getting a second solution, Solution of Legendre's equation, Solution of Bessel's equation, Solutions of Laguerre and Hermite's equations.
Month (September-October)	
09th Sept. – 14th Sept.	Special Functions Continued (Unit-II): Generating functions for Bessel function of integral order $J_n(x)$, Recurrence relations, Integral representation of Bessel Functions.
16th Sept. – 21st Sept.	Legendre polynomials $P_n(x)$, Generating functions for $P_n(x)$, Recurrence relations, orthogonality, Rodrigue's Relation.
23rd Sept. – 28th Sept.	Hermite Polynomials; Generating functions, Rodrigue's relation & orthogonality for Hermite polynomials.
30th Sept. – 05th Oct.	Laguerre polynomials; Generating function and Recurrence relations, Orthogonality, Rodrigue's Relation, Assignments
07th Oct. – 12th Oct.	The Gamma Function, The Dirac – Delta Function, Unit-Test. Unit-I: Vector spaces, Norm of a Vector.
Month (October-November)	
14th Oct. – 19th Oct.	Linear independence & dependence, Basis and dimension, Isomorphism of Vector spaces, Scalar/Inner product of vectors.
21st Oct. – 26th Oct.	Orthonormal basis, Gram-Schmidt Orthogonalization process, Linear Operators, Matrices.
28th Oct. – 02nd Nov.	Diwali Vacations,
04th Nov. – 09th Nov.	Inverse of matrix, Orthogonal, Unitary and Hermitian matrices, Cayley-Hamilton Theorem.
11th Nov. – 16th Nov.	Eigen-values and eigenvectors of matrices, Similarity transformation, Matrix diagonalization.
18th Nov. – 23rd Nov.	Simultaneous diagonalization and commutativity, Sessional Examination
25th Nov. – 30th Nov.	Revision of Unit I, II, III & IV, Doubt Clearance Session.
02nd Dec. and onwards	University Examinations

LESSON PLAN
Session: 2024-25 (ODD SEM)

Name of Teacher- Ms. Munish Sahni

Class- M.Sc. 3rd semester

Subject- Electronics-1 (23PHY23DA2)

WEEK S	SYLLABUS
Week1	Unit1 Transistors: Bipolar junction Transistor(BJT), Transistor operating modes
Week2	Transistor action, Transistor biasing configurations and characteristics
Week3	The Ebers-Moll model, Field Effect Transistors: Junction Field Effect Transistor(JFET),
Week4	Negative Resistance devices: Tunnel Diode, Backward Diode Uni-junction Transistor, p-n-p-n devices, p-n-p-n characteristics, Thyristor
Week5	Silicon Controlled Switch, SCS Characteristics. UnitII AC load line, Transistor models and parameters, Equivalent circuits
Week6	Two-Port devices and Hybrid model, Transistor Hybrid model, Transistor h-parameters
Week7	Conversion for h-parameter for three Transistor Configurations, Analysis of a Transistor Amplifier Circuit for CE, CB, CC,
Week8	Comparison of Transistor Amplifier Configurations, Linear Analysis of a Transistor Circuit, Miller's Theorem and its Dual
Week9	Cascading Transistor Amplifiers, classification of amplifiers, frequency response
Week10	RC coupled amplifier and its low frequency response, Revision
Week11	Unit III Differential amplifier, CMRR, circuit configuration, emitter coupled supplied with constant current, transfer characteristics, block diagram of Op. Amp
Week12	Off-set currents and voltages, PSRR, Slew rate, universal balancing techniques, Inverting and non-inverting amplifier
Week13	Basic applications-summing, scaling, current to voltage and voltage to current signal conversion, differential dc amplifier, voltage follower
Week14	bridge amplifier, AC-coupled amplifier. Integration, differentiation, analog computation, Butterworth active filters circuits, Review
Week15	UnitIV Comparators, AC/DC converters: Half wave & full wave rectifier, clamping circuits, Logarithmic amplifier, antilogarithmic amplifier
Week16	sample and hold circuits Digital to analog conversion –ladder and weighted resistor types, analog to digital conversion- counter type regenerative comparator (Schemitt trigger)
Week17	Basic principle of oscillators: Feedback, Square wave generator, pulse generator, triangle wave generator. Sinusoidal oscillators using opamp: Phase shift, Colpitts oscillator, Hartley and Wein Bridge oscillator, Review

Lesson Plan 2024-25 (Odd Sem)

Name of Teacher- Prince Kumar

Class - B.Sc. III(Physics Hons.) Semester V

Subject: Physics

Paper: Mathematical Physics–V (PH-51)

August (Week-1)	Introduction to groups, rings and fields
August (Week-2)	Vector spaces and subspaces.
August (Week-3)	Linear independence–basis and dimensions
August (Week-4)	Linear transformations
September (Week-1)	Algebra of linear transformations
September (Week-2)	Test and Assignment-1
September (Week-3)	Non-singular transformations. Isomorphism
September (Week-4)	Representation of linear transformations by matrices.
October (Week-1)	Matrix algebra Addition and multiplication null and unit matrices
October (Week-2)	Test and Assignment-2
October (Week-3)	Singular and non- singular matrices
November (Week-1)	Inverse of a matrix Eigenvalues and eigenvectors.
November (Week-2)	Digitalization solution of coupled linear ordinary differential equations.
November (Week-3)	Special matrices: Hermitian and skew symmetric and antisymmetric, orthogonal and unitary matrices
November (Week-4)	Similarly transformations and bilinear and quadratic forms. Trace of a matrix Cayley–Hamilton theorem. Function of a matrix.
December (Week-1)	Metric spaces. Inner product and metric concept.

Lesson Plan 2024-25 (Odd Sem)

Name of Teacher- Prince Kumar

Class - B.Sc. III(Physics Hons.) Semester V

Subject: Physics

Paper: Physics of Materials-I (PH-54)

August (Week-1)	Amorphous and crystalline materials.
August (Week-2)	Lattice translation vectors
August (Week-3)	Lattice with a basis—central and non—central elements
August (Week-4)	Unit cell, reciprocal lattice. Types of lattices
September (Week-1)	Crystal diffraction : Bragg' s law, diffraction of X-rays, atoms and geometrical structure factor.
September (Week-2)	Test and Assignment-1
September (Week-3)	S-ray diffraction methods - measurement of lattice parameter for cubic lattices.
September (Week-4)	Lattice vibrations
October (Week-1)	Linear monoatomic and diatomic chains
October (Week-2)	Test and Assignment-2
October (Week-3)	Qualitative description of the phonon spectrum in solid Brillouin zones
November (Week-1)	Acoustical and optical phonons.
November (Week-2)	Einstein and Debye theories of specific heat of solids T ³ law
November (Week-3)	Magnetic Properties of Matter Response of substances of magnetic field Dia, para and ferri and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains
November (Week-4)	Quantum mechanical treatment of paramagnetism. Curle' s law,
December (Week-1)	Weiss' s theory of ferromagnetism and ferromagnetic domains and discussion of B.H hysteresis. Qualitative discussion of ferrimagnets and ferrites.

Summary of Lesson Plan of College Faculty

Name of College: **Pt. Neki Ram Sharma Government College, Rohtak** Academic Session 2024-25 Semester: **Odd**

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

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

Name of Subject: **Computational Physics (23PHY23DB1)**

August 2024 to December 2024	
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.