

LESSON PLAN JULY 2024-NOV 2024(ODD SEM)

Name: Mr. Pardeep Kumar

Class: B.Sc II(Hons) III Sem

Paper code: Phy-304

Subject Name: Quantum Mechanics

Number of days: 4-6

22 JULY-22 AUG	Photoelectric effect. Compton effect. Reduced mass correction. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Two Slit experiment with electrons. Wave amplitude and wave functions, Probability.
23 AUG- 23 SEPT	Uncertainty principle. Basic postulates and formalism: Schrodinger equation, wave function, eigenvalues, probabilistic interpretation, conditions for physical acceptability of wave functions. Free particle.. Scattering problem in one dimension : Reflection and transmission by a finite potential step. Stationary solutions, Attractive and repulsive potential barriers.Gamow theory of alpha decay.
24 SEPT-26 OCT	Quantum phenomenon of tunneling. Tunnel diode-qualitative description. Spectrum for a square well (mention upper bound-no calculation). Bound state problems: General features of a bound particle system. Uncertainty principle. Basic postulates and formalism: Schrodinger equation, wave function, eigenvalues.
4 NOV- 22NOV	One-dimensional simple harmonic oscillator. 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. . Time independent Schrodinger equation, stationary states. Particle in onedimensional box, quantization of energy. Franck-Hertz experiment.

Name: Mr. Pardeep Kumar

Class: B.Sc III(NM) Vth Sem

Paper code: Phy-502

Subject Name: Quantum Mechanics

Number of days: 1-3(SEC-A+B) &(4-6)(B+C)

22 JULY- 22 AUGUST	Failure of (Classical) E.M. Theory. quantum theory of radiatio (old quantum theory), Photon,photoelectric effect and Einsteins photoelectric equation compton effect (theory and result). Inadequancy of old quantum theory, de-Broglie hypothesis. Davisson and Germer experiment. G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle.
23 AUGUST- 23SEPT	Time-energy and angular momentum, position uncertainty Uncertainty principle from de-Broglie wave, (wave-partice duality). Gamma Ray Microscope, Electron diffraction from a slit. Derivation of time dependent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance.
24 SEPT-26O CT	Normalization of wave function, concept of observable and operator. Solution of Schrodinger equation for harmomic oscillator ground states and excited states. Application of Schrodinger equation in the solution of the following one-dimensional problems.
4NOV- 22 NOV	Free particle in one dimensional box (solution of schrodinger wave equation, eigen function, eigen values, quantization of energy and momentum, nodes and antinodes, zero point energy). i) One-dimensional potential barrie $E > V_0$ (Reflection and Transmission coefficient). ii) One-dimensional potential barrier, $E > V_0$ (Reflection Coefficient, penetration of leakage coefficient, penetration depth).

Name: Mrs. NEELAM

Class: B.Sc. II (Non-Medical) Semester-3

SEC –A, B & C

Paper code: Phy-201

Subject Name: Computer Programming and Thermodynamics

Number of days: Monday, Tuesday, Wednesday

22 July – 22 Aug	Second law of thermodynamics, Carnot theorem, Absolute scale of temperature, Absolute Zero, Entropy, show that $dQ/T=O$, T-S diagram and Nernst heat law, Joule's free expansion, Joule Thomson (Porous plug) experiment. Joule - Thomson effect, Liquefication of gases. Air pollution due to internal combustion Engine. Numerical problems followed by Test
23 Aug – 23 Sept	Thermodynamics-II : Derivation of Clausius - Claperyron latent heat equation Phase diagram and triple point of a substance, Development of Maxwell thermo dynamical relations. Applications of Maxwell relations. Thermodynamic Function: Internal energy, Helmholtz Function, Enthalpy, Gibbs Function and relation between them Numerical problems followed by test
24 Sept – 26Oct	Computer Organisation, Primary and Algorithmic development Flow Charts and FORTRAN preliminaries Built-in functions and Executable/Non-Executable statements Sample programs to be done.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Input/output and IF, DO and GO TO statements Dimension array and function Sub Program Sample programs to be done. Revision and test.

Name: Mrs. NEELAM

Class: B.Sc. I (Single Major) Semester-1

Paper code: 24PHYS401DS02

Subject Name: Electricity and Magnetism

Number of days: Friday, Saturday

22 July – 22 Aug	Electric field: Conservative nature of Electrostatic Field. Electrostatic Potential. Derivation of electric field E from potential as gradient. Laplace's and Poisson equations. The Uniqueness Theorem. Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and Mechanical force on a conductor. Energy per unit volume. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor. Methods of images and its-application to simple electrostatic problems, plane infinite sheet and sphere. Numericals followed by test
23 Aug – 23 Sept	Magnetic Field: Biot-Savart's Law and its simple applications: straight wire and circular loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Syllabi and S.O.E. for B.Sc. (Physics) w.e.f. 2024-25 session M.D.University, Rohtak-124001 (Haryana) Dipole). Ampere's Circuital Law and its application to (1) Solenoid and (2) Toroid. Properties of B : curl and divergence. Vector Potential. Magnetic Force on (1) point charge (2) current carrying wire (3) between current elements. Torque on a current loop in a uniform Magnetic Field. Numerical problems followed by test
24 Sept – 26Oct	: Magnetic Properties of Matter: Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B , H and M , Electronic theory of dia and Para-magnetism, Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization- B - H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve
27 Oct – 03 Nov	<i>Diwali Vacation</i>

04 Nov – 22 Nov

DC current Circuits: Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem. Reciprocity theorem, Maximum Power Transfer theorem. Applications to dc circuits. Growth and decay of current in a circuit with (a) Capacitance and resistance (b) resistance and inductance (c) Capacitance and inductance (d) Capacitance resistance and inductance. Alternating Current Circuits: A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit. Numerical problems and revision.

Name: Dr. Manju Vashistha

Class: B.Sc I(NM) Ist Sem, Sec A, Sec B

Paper code: 24PHY401DS01

Subject Name: Mechanics

Number of days: 3,4

22 July – 22 Aug	Introduction of complete syllabus Unit I introduction, mechanics of a single particle, conservation law of linear and angular momentum, Conservation law of energy for single particle, system of particle, centre of mass and equation of motion, Conservation law of linear and angular momentum of system of particles Test and assignment of unit I
23 Aug – 23 Sept	Introduction to unit II, Generalised coordinates, velocity, acceleration, momentum, force and potential energy in terms of generalised coordinates Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear harmonic oscillator, simple pendulum, Atwood's machine, Numerical related problems Test and assignment of unit II Introduction to unit III rotational motion, moment of inertia, Torque, angular momentum, kinetic energy of rotation, Theorems of perpendicular and parallel axes with proof, Numerical problem and test of completed unit Moment of inertia of solid sphere, hollow sphere,
24 Sept – 26 Oct	Moment of inertia of spherical shell and solid cylinder, Moment of inertia of hollow cylinder and solid bar of rectangular cross-section, Acceleration of a body rolling down an inclined plane, Numerical problems and doubt class Test and assignment of unit III Introduction to Unit IV, Relativity theory, reference systems, uniformly rotating frame, laws of Physics in rotating coordinate system, centrifugal force, coriolis force and its applications, Inertial frames, Michelson-Morley experiment: search for ether, postulates of special theory of relativity, Lorentz transformations
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Length contraction, time dilation, velocity addition theorem, Variation of mass with velocity and mass energy equivalence, relativistic Doppler effect, relativistic kinematics, transformation of energy and momentum.

Name: Dr. Manju Vashistha

Class: B.Sc I(NM) Ist Sem

Paper code: 24PHY401SE01

Subject Name: Electrical circuit & Instrumentation skills

Number of days: 5,6

22 July – 22 Aug	Introduction to Syllabus. Introduction to Unit 1, Basic electricity Principles: Voltage, Current, Resistance and Power, Ohm's Law, series and parallel combination, 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, Specification of a Multimeter and their significance. Electronic voltmeter: Principles of voltage, measurement (block diagram only), Specification of an electronic voltmeter/multimeter and their significance , AC milli-voltmeter: type of AC millivoltmeter: Amplifier-Rectifier and Rectifier-Amplifier, block diagram of AC millivoltmeter, specification and their significance.
23 Aug – 23 Sept	Introduction to Unit II, Block diagram of basic CRO, construction of CRT, Electron gun, electrostatic focusing and acceleration, brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization, front panel controls. Specification 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.
24 Sept – 26 Oct	Introduction to Unit III, Digital instruments: Principle and working of digital meters, comparison of analog & digital instruments, characteristics of a digitalmeter. Working principles of digital voltmeter, 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.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Introduction to Unit IV, Solid state devices; resistors, inductors and capacitors, diode and rectifiers, components in series and in shunt, response of inductor and capacitors with DC and 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 an ac motor

Name: Dr. Manju Vashistha

Class: B.Sc I(Single Major) Ist Sem

Paper code: Phy-24PHYS401DS01

Subject Name: Mechanics

Number of days: 1,2

22 July – 22 Aug	Introduction of complete syllabus Unit I introduction, mechanics of a single particle, conservation law of linear and angular momentum, Conservation law of energy for single particle, system of particle, centre of mass and equation of motion, Conservation law of linear and angular momentum of system of particles Test and assignment of unit I
23 Aug – 23 Sept	Introduction to unit II, Generalised coordinates, velocity, acceleration, momentum, force and potential energy in terms of generalised coordinates Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear harmonic oscillator, simple pendulum, Atwood's machine, Numerical related problems Test and assignment of unit II Introduction to unit III rotational motion, moment of inertia, Torque, angular momentum, kinetic energy of rotation, Theorems of perpendicular and parallel axes with proof, Numerical problem and test of completed unit Moment of inertia of solid sphere, hollow sphere,
24 Sept – 26 Oct	Moment of inertia of spherical shell and solid cylinder, Moment of inertia of hollow cylinder and solid bar of rectangular cross-section, Acceleration of a body rolling down an inclined plane, Numerical problems and doubt class Test and assignment of unit III Introduction to Unit IV, Relativity theory, reference systems, uniformly rotating frame, laws of Physics in rotating coordinate system, centrifugal force, coriolis force and its applications, Inertial frames, Michelson-Morley experiment: search for ether, postulates of special theory of relativity, Lorentz transformations
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Length contraction, time dilation, velocity addition theorem, Variation of mass with velocity and mass energy equivalence, relativistic Doppler effect, relativistic kinematics, transformation of energy and momentum.

Name: Dr. Ekta

Class: M.Sc I (NM) Ist Semester

Paper code: 24PHY201DS03

Subject Name: Quantum Mechanics-I

Number of days: 4-6

10 Aug – 22 Aug	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 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.
23 Aug – 23 Sept	Angular momentum operator: Angular momentum operators and their representation in spherical polar co-ordinates; Eigenvalues and eigenvectors of L^2 , 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
24 Sept – 26 Oct	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
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 30 Nov	Perturbation Theory : Time independent perturbation theory; Non degenerate case, the energies and wave functions in first order the energy in second order; Anharmonic xperturbations of the form $3x$ and $4x^4$; Degenerate perturbation theory; Stark effect of the first excited state of hydrogen (Revision) (<i>Test</i>)

Name: Dr. EKTA

Class: Final year (Hons) Physics

Paper code: PHY 503

Subject Name: Statistical Physics-I

Number of Days – 1-3

22 July – 22 Aug	Introduction to statistical physics, Basic concepts of SM, Thermo-dynamical probability, Entropy, Partition function.
23 Aug – 23 Sept	MB statistics, Thermo-dynamical function of ideal gas and their relation with partition function. Entropy of Ideal gas and Gibbs paradox, Law of equipartition of energy and its applications, Introduction to radiation, assignment and Test, Numerical problems
24 Sept – 26Oct	Properties of Radiations, black body radiation, krichoff law, Wiens displacement law, Stefens law , Planks law of black body radiation, deduction of wiens displacement law , steffens law with planks law.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Introduction of LASER, basic principle and working. Thermal eq. of radiation , principle of detailed balance ,Einstein A and B coefficients, two level and three level systems, test ,assignments,

Name: Neeraj Kadian

Class: M.Sc Physics

Paper code: Phy- 24PHY201DSO2

Subject Name: Classical Mechanics

Number of days: (1-3)

8 Aug – 31 Aug	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.
2 Sept – 28 Sept	Moving coordinate systems and Motion in a central force field: Rotating frames, inertial forces, terrestrial applications of Coriolis force, Two body problem: Reduction to equivalent one body problem, 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
30 Sept – 26 Oct	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, Hamilton-Jacobi equation and their solutions, Use of Hamilton-Jacobi method for the solution of Harmonic oscillator problem, Hamilton's principle function, Hamilton's characteristic function and their properties.SEMINAR-2
27 oct – 3 Nov	Diwali Vacations

4 Nov-30 Nov	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.
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Name: Neeraj Kadian

Class: B.Sc II (NM) 3rd Sem, sec (A,B,C)

Paper code: Phy-302

Subject Name: Optics

Number of days: (4-6)

22 July – 07 Sept	Introduction of I unit, speed of transverse waves on a uniform string, Speed of longitudinal waves in fluid, superposition of waves (Physical idea Fourier theorem and Fourier series), evaluation of Fourier coefficients, Limitations of Fourier theorem (Dirichlet conditions), importance of Fourier theorem. Even and odd functions, complex form of Fourier series, Analysis of Rectangular wave or square wave, triangular wave, Halfwave and fullwave rectifier Fourier transforms and its properties with applications, <i>Test and assignment of unit I</i>
9 Sept – 26 Oct	Introduction Of Unit II, Matrix methods in paraxial optics effects of translation and refraction Derivation of thin lens and thick lens formulae. Unit plane nodal planes, System of thin lenses, Introduction to aberrations, chromatics, spherical, coma, astigmatism and distortion aberrations Revision and Test Unit plane nodal planes, System of thin lenses, Introduction to aberrations, chromatics, spherical, coma, astigmatism and distortion aberrations Revision and Test
27 oct – 3 Nov	<i>Diwali Vacations</i>

4 Nov-30 Nov	Introduction of unit III, interference of light , types of interference, Young's double slit experiment, coherent sources, conditions for good interferences, analytical treatment of interference Introduction of syllabus Physical optics, Fresnel's biprism, fringes with white light using Biprism, determination of thickness of thin sheet of transparent material, Lloyd mirror, difference between Biprism and Lloyd mirror fringes, phase changes on reflection (stokes law)
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Name: Ms. ANJU RANI

Class: B.Sc. III (NM) Semester-Vth

Paper code: Phy-501

Subject Name: Solid State Physics

Number of Days: 1-6(SEC-A+B+C)

22 July – 22 Aug	Crystalline and gassy forms, liquid crystals. Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Unit cell and primitive cell, Wigner Seitz primitive Cell, symmetry operations for a two dimensional crystal.
23 Aug – 23 Sept	Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc sulphide. Crystal structures of Sodium Chloride and diamond. Numerical Problems. Test of unit -1.
24 Sept – 26 Oct	X-ray diffraction, Bragg's Law and experimental x-ray diffraction methods, K-space. Reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Specific heat: Specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids. Numerical Problems and doubts. Test and Assignments.

Name: Ms. ANJU RANI

Class: B.Sc. Physics (H) Semester-III

Paper code: Phy-301

Subject Name: Mathematical Physics-III

Number of Days: Thursday, Friday, Saturday

22 July – 22 Aug	Importance of complex numbers and their graphical representation. De Moivre's theorem. Roots of complex numbers. Euler's formula. Functions of complex variables. Cauchy-Riemann conditions. Analytic functions. Singularities.
23 Aug – 23 Sept	Differentiation and integration of a function of a complex variable. Cauchy's theorem. Cauchy's integral formula. Morera's theorem. Cauchy's inequality. Liouville's theorem. Fundamental theorem of algebra.
24 Sept – 26 Oct	Multiple valued functions, simple ideas of branch points and Riemann surface. Power series of a complex variable, Taylor and Laurent series, Residue and residue theorem. Multiple valued functions. Contour integration and its application to evaluation of integrals.
27 Oct – 03 Nov	<i>Diwali Vacation</i>

04 Nov – 22 Nov	Class test, Series Solution of Linear Second order Ordinary Differential Equations: Singular points of second order differential equations and their importance. Series methods (Frobenius) Legendre. Bessel, Hermite and Laguerre differential equations.
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Name: Ms. ANJU RANI

Class: B.Sc. Physics (H) Semester-I

Course code: 24PHY401MI01

Subject Name: Physics in Everyday Life

Number of Days: Tuesday, Wednesday

22 July – 22 Aug	MECHANICS: Every day activities related to Force, weight, work, energy, power and centrifuge; washing machine. Numericals and Test.
23 Aug – 23 Sept	HEAT: Variation of boiling point with pressure, pressure cooker, cooling by expansion, refrigerator, air conditioner, Bernoulli principle Bunsen burner, aero-plane. Numericals and Test.
24 Sept – 26 Oct	SOUND AND OPTICS: Sound waves, Doppler Effect, power of lens, long sight and short sight, microscope, telescope, binocular camera, video camera. Numericals and Test.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	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: Renu Kumari

Class: M.Sc Physics

Paper code: Phy- 24PHY201DSO1

Subject Name: Mathematical Physics

Number of days (1-3)

8 Aug – 31 Aug	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-Hamilton Theorem, Inverse of matrix, Orthogonal, Unitary and Hermitian matrices, Eigenvalues and eigenvectors of matrices, Similarity transformation, Matrix diagonalization, Simultaneous diagonalization and commutativity
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2 Sept – 28 Sept	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, Wronskin and getting a second solution, Solution of Legendre's equation, Solution of Bessel's equation, Solutions of Laguerre and Hermite's equations .SEMINAR-1
30 Sept – 26 Oct	Special functions, Generating functions for Bessel function of integral order $J_n(x)$, Recurrence relations, Integral representation; Legendre polynomials $P_n(x)$, Generating functions for $P_n(x)$, Recurrence relations, orthogonality, Rodrigue's Relation; 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. SEMINAR-2
27 oct – 3 Nov	Diwali Vacations
4 Nov-30 Nov	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: Renu Kumari

Class: Final year (Hons) Physics

Paper code: PHY 506

Subject Name: *Nano technology*

Number of Days – (4-6)

22 July–22 Aug	Introduction of nano physics, properties of nano materials, example of nano materials.
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23Aug – 27 Sept	Free electron theory and its features ,drawbacks and success of free electron theory, idea of band structure, metal ,insulator and semiconductor
28 Sept – 26 Oct	Density of state in bands , density of states in 1D ,2D, 3D, AND 0D . variation of density of state with band gap and size of crystal
27 Oct- 3 Nov	<i>Diwali Vacations</i>
4 Nov – 22 Nov	K P model, Brillion zones ,Effective mass, electron confinement in two D AND 1D. Idea of quantum well structure, quantum dots ,quantum wires ,test,assignments and numerical problems

Name: Ms. SANKET

Class: B.Sc. Physics (H) Semester-III

Paper code: Phy-302

Subject Name: Thermal Physics- I

Number of Days: Monday, Tuesday, Wednesday

22 July – 22 Aug	Introduction to the Paper. Basic definations. Derivation of pressure exerted by gas Derivation of Maxwell law of distribution of velocities Experimental verification of Maxwells distribution. Mean free path(introduction) , Problem discussion assignment , Mean free path and its Derivation for mean free path
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23 Aug – 23 Sept	Transport phenomena :Viscosity, Conduction , Diffusion .Brief introduction to Brownian Motion. . Brownian motion. The theory of Einstein The theories of Langevin and experimental determination of Avogadro's number
24 Sept – 26Oct	Examples of Brownian motion in physics (galvanometer mirror, sedimentation, Johnson's noise, Ideal gases: Equation of state, internal energy, specific heats, entropy, Isothermal and Adiabatic processes. Compressibility and expansion coefficient. Adiabatic lapse rate
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	Class test, Real gases: Deviations from the ideal gas equation. The virial equation Andrew's experiments on CO ₂ gas, continuity of liquid and gaseous state. Van der Wall's equation Class test, Critical constants and law of corresponding states. . Free expansion, Joule-Thomson Effect. Assignment taken .Numerical Practice, Problem discussion

Name: Ms. SANKET

Class: B.Sc. Single Major (Physics) Semester-I

Paper code: 24PHYS401SE01

Subject Name: Basic Instrumentation Skills

Number of Days: 1-2

22 July – 22 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. Test
23 Aug – 23 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. Test
24 Sept – 26Oct	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. Assignment . Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Relay protection device.
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 22 Nov	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: wire nuts, crimps, terminal blocks, and solder. Preparation of extension board. Revision and test

Name: POOJA RANI

Class: Final year (Hons) Physics

Paper code: PHY 502

Subject Name: Electromagnetic Theory -1

Days :1-3

22 July – 22 August	Maxwell equations and Displacement current, Vector and Scalar potentials, Gauge transformations, Lorentz and Coulomb gauge
23 August – 23 September	Wave equations. Plane waves in dielectric media, Poynting theorem and Poynting vector. Energy density, Physical concept of electromagnetic (e.m) field momentum density and e.m field angular momentum density
24 September -26 October	Boundary conditions at interface between different media, Reflection and refraction of a plane wave, Fresnel Formulae for dielectric interface,
04 November – 22 November	Total internal reflection Brewster's angle, Conductivity of ionized gas Propagation of e.m. waves in ionosphere

Name: Pooja Rani

Class: B.Sc II (hons) 3rd Sem,

Paper code: Phy-303

Subject Name: wave Optics

Number of days: 1-3

22 july -22 august	Introduction and free oscillations, degree of freedom
	Linearity and superposition principle, simple harmonic motion
	Characteristics of SHM, superposition of two collinear harmonic oscillator
	Simple pendulum, superposition of Anharmonic oscillation
23 august-23 sept	Beat and system with one and two degree of freedom
	Coupled oscillator with same frequency and oscillator with different frequency oscillator
	Waves , type of waves, wave equation, travelling wave equation
	Phase velocity, energy transport of travelling wave, standing wave, group velocity
24 sept-26 october	Normal coordinates, normal modes, energy of vibrating string, plucked string, stretched string
	<i>Introduction to modes, light sources , em nature of light, coherence</i>
	Interference, light sources, classification in terms of amplitude and wavefront
	Young double slit experiment, llyod mirror, fresenal biprism
	Thin films, wedge shaped films, haidinger fringes, fizeau fringes
04 nov -22 november	Michelson interferometer, theory of fringes, application theory of partial coherence
	<i>Coherence, numerical, time and length</i>
	Fabry perot interferometer, airy formula, visibility of fringes, sharpness of fringes

Name: Dr. Sonu

Class: M.Sc Ist Semester

Paper code: 24PHY201DS04

Subject Name: Physics of Electronic Devices

Number of days: 4-6

10 Aug – 22 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
23 Aug – 23 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
24 Sept – 26Oct	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
27 Oct – 03 Nov	<i>Diwali Vacation</i>
04 Nov – 30 Nov	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: Dr. Sonu

Class: Final year (Hons) Physics

Paper code: PHY 501

Subject Name: Mathematical Physics -1

Number of Days - 3

22 July – 22 Aug	Addition and multiplication null and unit matrices. Singular and nonsingular matrices. Inverse of a matrix Eigenvalues and eigenvectors Digitalization solution of coupled linear ordinary differential equations
23 Aug – 23 Sept	Hermitian and skew symmetric and antisymmetric, orthogonal and unitary matrices Similarly transformations and bilinear and quadratic forms. Trace of a matrix Cayley-Hamilton theorem
24 Sept – 26 Oct	Introduction to groups, rings and fields. Vector spaces and subspaces. Linear independence-basis and dimensions. Linear transformations. Algebra of linear transformations. Non-singular transformations. Isomorphism. Representation of linear transformations by matrices
04 Nov – 22 Nov	Function of a matrix. Inner product and metric concept

Name: VIKAS SHARMA

Class: Final year (Hons) Physics

Paper code: PHY 504

Subject Name: *Physics of Materials-I*

Number of Days – 4-6

22 July – 22 Aug	Amorphous and crystalline materials. Lattice translation vectors. Lattice with a basis-central and non-central elements. Unit cell, reciprocal lattice. Types of lattices. Crystal diffraction : Bragg's law, diffraction of X-rays,
23 Aug – 23 Sept	Atoms and geometrical structure factor. X-ray diffraction methods – measurement of lattice parameter for cubic lattices. Lattice vibrations. Linear monoatomic and diatomic chains. Acoustical and optical phonons. Qualitative description of the phonon spectrum in solid Brillouin zones
24 Sept – 26 Oct	Debye theories of specific heat of solids T ³ law. 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.
04 Nov – 22 Nov	Quantum mechanical treatment of paramagnetism. Curle's law, Weiss's theory of ferromagnetism and ferromagnetic domains and discussion of B.H hysteresis. Qualitative discussion of ferrimagnets and ferrites

Name: Vikas

Class: B.Sc.5th Sem (Hons.)

Paper code: PHY-505

Subject Name: Electronics Devices

Class working days: (1-3)

22 July – 22 Aug	<p>Basic semiconductor physics ,p and n type semiconductors Energy level diagram, conductivity and mobility, p-n junction fabrication (simple idea). Barrier formation in p-n junction diode, current flow mechanism in forward and reverse biased diode. Single p-n junction devices (physical explanation, current voltage characteristics)</p>
23 Aug – 23 Sept	<p>One or two applications and Two terminal devices-rectifier diode, Zener diode, photo diode, LED, solar cell and varactor diode. Two junction devices p-n-p and n-p-n transistors, physical mechanism of current flow, active, cutoff and saturation regions.</p>
24 Sept – 26Oct	<p>Transistor in active region and equivalent circuit. Three terminal devices junction field effect transistor (FET) unijunction transistor (UJT) and their equivalent circuits</p>
04 Nov – 22 Nov	<p>Mesh analysis for d.c. and a.c. Nodal analysis duality in networks. To Equivalent of a four terminal network. Thevenin and Norton theorem with Circuit diagram . Maximum power transfer superposition and reciprocity theorems. Z, Y, H parameters</p>