Physics Department
Lesson Plan Jan-May 2025(Even Semester)

Name: Ms. Neha
Class: B.Sc. Pass course 4th Sem, Sec A, Sec B, Sec C
Paper code: Phy-401
Subject Name: Statistical Physics
Number of days: 1-3

21 Jan – 7 Feb	Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxs. Case with weightage (general), assignment, Phase space,microstates and macrostates,
8 Feb – 8 March	Statistical fluctuations constraints and accessible States Thermodynamical probability, Postulates of Statistical Physics. Division of Phase space into cell, test, Condition of equilibrium between two system in thermal contact. b-Parameter, Test.
09 March – 16 March	**Holi vacations**
17 March – 17 April	Entropy and Probability, Boltzman's distribution law. Evaluation of A and b. Bose-Einstein statistics, Application of B.E. Statistics to Plancks's radiation law, B.E. gas. Test
18 April – 5 May	Fermi-Dirac statistics, M.B. Law as limiting case of B.E. Degeneracy and B.E.,Condensation. F.D. Gas, test, electron gas in metals. Zero point energy, Specific heat of metals and its solution. Revision and Test

Name: Dr. Manju Vashistha
Class: B.Sc I(Physical Science) 2nd Sem, Sec A, Sec B
Paper code: 24PHY402DS01
Subject Name: Electricity and Magnetism
Number of days: 3,4

01Feb-08 March	**Introduction of complete syllabus** **Unit I,** Introduction, Electric field and Electric Potential: Scalars and Vectors, dot and cross product, triple vector product, scalar and vector fields, differentiation of a vector , Gradient of a scalar and its physical significance, Integration of a vector(line, surface and volume integral and their physical significance), Gauss's divergence theorem and Stocks theorem. Derivation of field E from potential as gradient, derivation of Laplace and Poisson equations. Electric flux, Gauss's Law and its application to spherical shell, uniformly charged infinite plane and uniformity charged straight wire, mechanical force of charged surfaces, energy per unit volume Numerical and test
09 March – 16 March	***Holi Vacation***
17 March – 17 April	**Unit II,** Introduction, Magnetic field: Biot-Savart's Law and its simple applications, Ampere's Circuital Law and its application, Properties of B: curl and divergence. Vector potential, 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, magnetisation 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(Langvein's theory), Cycle of magnetization, B-H curve and hysteresis loop, energy dissipation, Hysteresis loss and importance of Hysteresis curve Numerical and test
18 April - 17 May	**Unit III**, Introduction, Electromagnetic induction: Faraday's laws of induction and Lenz's Law, Self induction, Mutual inductance, energy stored in a magnetic field, Maxwell equation and their derivations, displacement current, vector and scalar potentials, boundary conditions at interface between two different media, propagation of electromagnetic wave (Basic idea, no derivation) pointing vector and pointing theorem. Numerical and test **Unit IV**, Introduction, DC current circuits: Electric current and current density, Electrical conductivity and Ohm's law, Applications to dc circuits,
19 May – 31 May	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 circuits: (1) Resonance, (2) Power dissipation (3) Quality factor and (4) Band width, parallel LCR circuit. Numerical and Test

Name: Dr. Manju Vashistha
Class: B.Sc I(Single Major) 2nd Sem,
Paper code: 24PHYS402DS02
Subject Name: Electronic devices and Applications
Number of days: 1,2

01Feb-08 March	**Introduction of complete syllabus** **Unit I**, Introduction, Semiconductors: Energy bands in solids, intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors, p-n junction diode and their characteristics, Zener and Avalanche breakdown, Zener diode, Zener diode as a voltage regulator, light emitting diodes (LED), photoconduction in semiconductors, photodiode, solar cell Numerical and test
09March–16March	***Holi Vacation***
17March – 17 April	**Unit II**, Introduction, Transistors: Junction transistors, working of NPN and PNP transistors, three configurations of transistor (C-B,C-E,C-C modes), Common base, common emitter and common collector characteristics of transistor, constants of a transistor and their relation, advantages and disadvantages of C-E configuration. D.C. load line, transistor biasing; various method of transistor biasing and stabilization. Numerical and test
18April - 17 May	**Unit III**, Introduction, Transistor Amplifiers: Amplifiers, common base and common emitter amplifiers, coupling of amplifiers, various methods of coupling, R-C coupled amplifier (two stage, concept of band width, no derivation), feedback in amplifiers, advantages of negative feedback, emitter follower. Numerical and test
19May – 31 May	**Unit IV**, Introduction, PN junction diode as a rectifier, half wave and full wave rectifiers (with derivation), filters (series inductor, shunt capacitance, L-section or choke), Oscillatiors: Oscillatiors, Principle of oscillation, classification of oscillatiors, condition for self-sustained oscillation: Brakhasuen criterion for oscillation, tuned collector common emitter oscillator, Hartley oscillator. Numerical and Test.

Name: Dr. EKTA
Class: M.Sc-Physics, 2nd Sem
Paper code: 24PHY202DS02
Subject Name: Quantum Mechanics –II
Number of days: 4-6

09 Jan -08 Feb	Variational methods: Ground state of Helium by both variational and perturbation methods; The hydrogen molecule; WKB approximation; Time dependent perturbation theory; Constant perturbation; Harmonic perturbation; Fermi's golden rule; Adiabatic and sudden approximation. Numerical and test.
10 Feb- 08 March	Semi-classical theory of radiation: Transition probability for absorption and induced emission; Electric dipole transition and selection rules; Magnetic dipole transitions; Forbidden transitions; Higher order transitions; Einstein's coefficients
09 March – 16 March	***Holi Vacation***
17 March – 17 April	Collision in 3D and scattering: Laboratory and C.M. reference frames; scattering amplitude; Differential scattering cross section and total scattering cross section; The optical theorem; Scattering by spherically symmetric potentials; Partial waves and phase shifts; Scattering by a perfectly rigid sphere and by square well potential; Complex potential and absorption; The Born approximation.
18 April -05 May	Identical particles: The principle of indistinguishability; Symmetric and antisymmetric wave functions; Spin and statistics of identical particles; The Slater determinant; The Pauli exclusion principle; Spin states of a two-electron system; States of the helium atom; Collision of identical particles.

Name: Dr. EKTA
Class: B.Sc. Physics (H) Semester-VI
Paper code: Phy-603
Subject Name: Statistical Physics -II
Number of days: 1-3

7 Jan – 7 Feb	Introduction of Statistical physics, Three types of statistics, Bose – Einstein Statistic, Postulates of BE Statistic.
8 Feb – 8 March	Partition function of bosons, Thermodynamics functions of boson gas and photon gas, B-E condensation, critical temperature of bosons gas Hydrogen para and ortho , Introduction of Fermi-Dirac statistic, Postulates of FD Statistic, assignment
09 March – 16 March	**Holi vacations**
17 March – 17 April	Fermi- Dirac Statistics, thermodynamic function of fermion gas, Thermodynamics functions of electron gas, Difference between boson and fermion gas, assignment, test
18 April – 5 May	Specific heat of electrons, Fermi energy, Fermi temperature, test, revision

Name: Ms. SANKET
Class: B.Sc I Single Major-Physics, 2nd Sem
Paper code: 24PHYS402DS01
Subject Name: Mathematical Physics- I
Number of days: 3-6

01Feb-08 March	Introduction of complete syllabus Recapitulation of vectors: Properties of vectors under rotations. Scalar product and its Invariance under rotations. Vector product, Scalar triple product and their interpretation in terms of area and volume respectively. Scalar and Vector fields, Vector Differentiation: Directional derivatives and normal derivatives. Gradient of a scalar field and its geometrical interpretation. Divergence and curl of a vector field. Del and Laplacian operators. Vector identities, Gradient, divergence, curl and Laplacian in spherical and cylindrical coordinates. Numerical and test
09 March – 16 March	***Holi Vacation***
17 March – 17 April	Unit II introduction, Vector Integration: Ordinary Integrals of Vectors. Multiple integrals, Jacobian. Notion of infinitesimal line, surface and volume elements. Line, surface and volume integrals of Vector fields. Flux of a vector field. Gauss' divergence theorem, Green's and Stokes Theorems and their applications (no rigorous proofs) Orthogonal Curvilinear Coordinates and Multiple integrals: Orthogonal curvilinear coordinates, Derivation of gradient, divergence, curl and Laplacian in Cartesian, spherical and cylindrical coordinate systems. Change of variables and Jacobian. Evaluation of line surface and volume integrals.Numerical and test
18 April - 17 May	Unit III, introduction, Differential Equations: Classification of differential equations: linear and nonlinear, homogeneous and non-homogenous equations, First order: Separable and exact equations. Integrating factor. Second Order: Homogeneous equations with constant coefficients. Wronskin and general solution Statement of Existence and Uniqueness theorem for initial value problems. Solution of non-homogeneous equations by operator (D) method. Particular integral. Method of undetermined coefficients and variation of parameters Equations reducible to those with constant coefficient. Numerical and test Fourier Series: Fourier series, Dirichlet conditions (Statement only). Orthogonality of sine and cosine functions. Sine and cosine series. Distinctive features of Fourier expansions.
19 May – 31 May	Halfrange expansions. Applications Square wave triangular wave, output of full wave rectifier and other simple functions Summary of infinite series. Definition of Dirac delta function. Representation as limit of a Gaussian function and rectangular function. Properties of Dirac delta function.

Name: Ms. Sanket
Class: B.Sc. Physics (H) Semester-IV
Paper code: Phy-402
Subject Name: Thermal Physics-II
Number of days: 1-3

7 Jan – 7 Feb	Zeroth and first law of thermodynamics, Reversible and irreversible processes. Conversion of heat into work Carnot theorem, test , Second law of thermodynamics.
8 Feb – 8 March	Thermodynamic temperature, assignment Clausius inequality. Entropy changes in reversible and irreversible processes, numerical , Temperature-entropy diagrams. Test,
09 March – 16 March	**Holi vacations**
17 March – 17 April	The principle of increase of entropy & its applications Thermodynamic potentials: Enthalpy, Gibbs and Helmholtz functions. Maxwell relations and their applications. Magnetic work. class test. Magnetic cooling by adiabatic demagnetization, Approach to absolute zero
18 April – 5 May	Change of phase, equilibrium between a liquid and its vapour. Clausius-Clapeyron equation **,** The triple point with examples from physics. test. Second order phase transitions *Revision And Test*

Name: Ms. Renu Kumari
Class: B.Sc. Physics (H) Semester-VI
Paper code: Phy-606
Subject Name: Nano Physics
Number of days: 4-6

07 Jan – 31 Jan	Introduction of nano technology, particle size determination, mass spectroscopy, TEM, SEM,
01 Feb –08 March	X-Ray Diffraction for NPs, Significance of XRD, Photolumenescence spectra and Raman spectroscopy for nano particles, Increase in width of nano particles, assignment
09 March –16 March	holi vacations
17 March – 17 April	Methods of synthesis of nano particles, Top – Down and Bottom –Up approach, Physical and chemical methods, Ball milling, test
18 April -05 May	Method of synthesis of nano- particles-ion implantation, chemical bath deposition, CVD, PVD, MBE, revision

Name: Renu Kumari
Class: B.Sc -I(Physical Science) 2nd Sem
Paper code: 24PHY402SE01
Subject Name: Computational Techniques in Physics
Number of days: 5,6

01Feb-08 March	Data types: Integer and Floating-point arithmetic; Fortran variables; Real and Integer variables; Input and Output statements; Formats; Expressions; Built in functions; Executable and non-executable statements; Control statements; Go To statement; Arithmetic IF and logical IF statements; Flow charts; Truncation errors, Round off errors; Propagation of errors. Block IF statement; Do statement; Character DATA management; Arrays and subscripted variables
09 March – 16 March	*Holi Vacation*
17 March – 17 April	Numerical differentiation (Forward and Backward difference formula) and Integration (Trapezoidal and Simpson rules), Curve Fitting: Principle of least square; Linear regression; Polynomial regression; Exponential and Geometric regression, Interpolation: Finite differences; Interpolation with equally spaced points; Gregory - Newton's Interpolation formula for forward and backward interpolation; Solution of ODE First order differential equation using Euler, modified Euler and Runge- Kutta second order methods Second order differential equation e.g. First order differential equation, Radioactive decay, Current in RC, LC circuits with DC source
18 April - 17 May	Creating Python Programs: Identifiers and keywords; Literals, numbers, and strings; Operators; Expressions; Input/output statements; Defining Functions; Control structures (conditional statements, loop control statements, break, continue and pass, exit function), default arguments. Mutable and immutable objects. Testing and debugging a program. Creating Python Programs: Identifiers and keywords; Literals, numbers, and strings; Operators; Expressions; Input/output statements; Defining Functions Control structures (conditional statements, loop control statements, break, continue and pass, exit function), default arguments. Mutable and immutable objects. Testing and debugging a program
19 May – 31 May	Test and revision

Name: Renu Kumari
Class: B.Sc -I(Single Major Physics) 2nd Sem
Paper code: 24PHY402SE01
Subject Name: Computational Techniques in Physics
Number of days: 1,2

01Feb-08 March	Data types: Integer and Floating-point arithmetic; Fortran variables; Real and Integer variables; Input and Output statements; Formats; Expressions; Built in functions; Executable and non-executable statements; Control statements; Go To statement; Arithmetic IF and logical IF statements; Flow charts; Truncation errors, Round off errors; Propagation of errors. Block IF statement; Do statement; Character DATA management; Arrays and subscripted variables
09 March – 16 March	*Holi Vacation*
17 March – 17 April	Numerical differentiation (Forward and Backward difference formula) and Integration (Trapezoidal and Simpson rules), Curve Fitting: Principle of least square; Linear regression; Polynomial regression; Exponential and Geometric regression, Interpolation: Finite differences; Interpolation with equally spaced points; Gregory - Newton's Interpolation formula for forward and backward interpolation; Solution of ODE First order differential equation using Euler, modified Euler and Runge- Kutta second order methods Second order differential equation e.g. First order differential equation, Radioactive decay, Current in RC, LC circuits with DC source
18 April - 17 May	Creating Python Programs: Identifiers and keywords; Literals, numbers, and strings; Operators; Expressions; Input/output statements; Defining Functions; Control structures (conditional statements, loop control statements, break, continue and pass, exit function), default arguments. Mutable and immutable objects. Testing and debugging a program. Creating Python Programs: Identifiers and keywords; Literals, numbers, and strings; Operators; Expressions; Input/output statements; Defining Functions Control structures (conditional statements, loop control statements, break, continue and pass, exit function), default arguments. Mutable and immutable objects. Testing and debugging a program
19 May – 31 May	Test and revision.

Name: Mrs. Neeraj Kadian
Class: B.Sc II (NM) 4th Sem, Sec A, Sec B ,Sec C
Paper code: Phy-402
Subject Name: Optics
Number of days: 4-6

30Jan - 08 March	Introduction to unit I, Interference by division of amplitude: Colour of thin films, wedge shaped film, Newton's ring, Continue ,Michelson Interferometers, Fresnel's Diffraction- half period zone, zone plate, diffraction at a straight edge Rectangular slit and circular aperture, test and assignment Fresnel's Diffraction- half period zone, zone plate, diffraction at a straight edge, Rectangular slit and circular aperture Introduction to unit II, Fraunhoffer diffraction-one slit, two slit, N-slit Plane transmission grating spectrum , dispersive power of a grating Limit of resolution, Rayleigh's criterion Resolving power of telescope and a grating test and assignment of unit II,
09 march-16 March	***Holi Vacations***
17 March-17 April	Introduction to unit III, polarisation and double refraction Polarisation by reflection and scattering, Malus law, huygen's wave theory of double refraction,Analysis of polarised light- nicol prism, quarter wave plate and half wave plate
18 April-05 May	Production and detection of plane, circularly and elliptical polarized light , optical activity, fresnel's theory of rotation, specific rotation Polarimeters. Revision and Tests

Name: Mrs. Neeraj Kadian
Class: M.Sc(P) Physics-2nd sem
Paper code: 24PHY202DS04
Subject Name: Solid State Physics
Number of days: 1-3

09 Jan- 08 March	Crystalline solids, Lattice, The basis, Lattice translation vectors, Direct lattice, Two and three dimensional Bravais lattice, Conventional units cells of FCC, BCC, NaCl, CsCl, Diamond and cubic ZnS, Primitive lattice cell of FCC, BCC and HCP, Packing fraction: Simple Cubic, BCC, FCC, HCP and diamond structures Interaction of x-rays with matter, Absorption of xrays, elastic scattering from a perfect lattice, The reciprocal lattice and its application to diffraction techniques, Ewald's construction, The Laue, Powder and rotating crystal methods, Atomic form factor, Crystal structure factor and intensity of diffraction maxima, Crystal structure factors of BCC, FCC, monatomic diamond lattice, polyatomic CuZn. Unit-2 Vibration of one-dimensional mono and diatomic chains, Phonon momentum, Density of normal modes in one and three dimensions, Quantization of lattice vibrations, Measurement of phonon dispersion using inelastic neutron scattering, Point defects, Line defects and planer (stacking) faults, Fundamental ideas of the role of dislocation in plastic deformation and crystal growth, Observation of imperfection in crystals, X-rays and electron microscopic techniques.
09 march-16 March	***Holi Vacations***
17 March-17 April	Unit-3 Electron in periodic lattice, Block theorem, Kronig-Penny model and band theory, Classification of solids, Effective mass, Weak-binding method and its application to linear lattice, Tight-binding method and its application to Simple cubic, BCC and FCC crystals, Concepts of holes, Fermi surface: Construction of Fermi surface in two-dimension, de Hass van Alfen effect, Cyclotron resonance, Magneto-resistance. Unit-4 Weiss Theory of Ferromagnetism Heisenberg model and molecular field theory of ferromagnetism of spin waves and Magnons, Curie-Weiss law for susceptibility. Ferri and Anti Ferro-magnetic order, Domains and Block wall energy, Occurrence of superconductivity
18 April-05 May	Meissner effect, Type-I and Type-II superconductors, Heat capacity, Energy gap, Isotope effect, London equation, Coherence length, Postulates of BCS theory of superconductivity, BCS ground state, Persistent current. High temperature oxide super conductors (introduction and discovery).

Name:Pooja Rani
Class: B.Sc. Physics (Hons) 6th Sem
Paper code: Phy-602
Subject Name: *Electromagnetic Theory-II*
Number of days: 1-3

.Week	Syllabus
07 Jan-07 Feb	Polarization of e.m. waves, Description of linear, circular and elliptical polarization,
08 Feb- 08 March	Propagation of e.m waves in anisotropic media Symmetric nature of dielectric tensor, Fresnel's formula. Light propagation in uniaxial crystal, Double refraction. Nicol prism, Production of circularly and elliptically polarized light.
09March-16Mach	**Holi Vacations**
17 March-17April	Babinet compensator. Analysis of polarized light, Wave guides. Coaxial transmission line, Modes in rectangular wave guide Energy flow and attenuation in wave guides, Rectangular resonant caves, Planar optical wave guides Planar dielectric wave guide.
18April- 5 May	Condition of continuity at interface. Phase shift on total reflection, Eigen value equations, phase and group velocity of the guided waves, Field energy and power transmission. *Revision and test*

Name: POOJA RANI
Class: B.SC 2nd Physics (H) Semester-IV
Paper code: Phy-403
Subject Name: VIBRATION and WAVE OPTICS
Number of days: 4-6

7Jan – 7 Feb	Kirchhoff's integral theorem and kirchoff's laws, Fresnel-Kirchhoff integral formula, its application to diffraction problems, Fraunhoffer diffraction, Single slit, rectangular slit, circular aperture. Multiple slit.
8feb-8March	Plane diffraction grating, Resolving power and depressive power of a plane diffraction, Fresnel diffraction, Fresnel's integrals, Cornu's spiral, Fresnel diffraction pattern at a straight edge, a slit and a wire.
09 march-16March	**Holi Vacations**
17 march-17 April	. wire (qualitatively using Cornu's spiral, holography recording and reconstruction method and its theory as interference between two plane waves
18April-5May	reconstruction method and its theory as interference between two plane waves. Test and Revision

Name: Pardeep Kumar
Class: B.Sc. 4th Sem (Hons.)
Paper code: Phy- 404
Subject Name: Atomic and Nuclear Physics
Number of days: 4-6

07JAN – 31 JAN	Atoms in electric and magnetic fields: Electron spin. Stern-Gerlach experiment, magnetic field from classical view point, Orbital angular momentum, dipole moment and energy in Zeeman effect. Spin-orbit coupling. Fine structure. Total angular
01 FEB – 09 MARCH	Momentum, Many-electron atoms: Pauli exclusion principle, Many particles in one dimensional box. Vector model. L-S and jj coupling Symmetric and ant symmetric wave functions. Atomic shell model
09 MARCH – 16 MARCH	***HOLI VACATIONS***
17 MARCH – 17 APRIL	Doublet Structure of alkali spectra. Empirical evidence of multiples, Selection rules, Properties: mass, size, angular momentum, constituents, binding energy, stability. Models: Liquid drop model. Mass formula. radioactivity: Law of radioactive decay. Theory of successive radioactive, Numerical Problems
18 APRIL – 05 MAY	Transformations. Radioactive series (mention the series-diagram not needed) Periodic table, Spectral notations for atomic states, Shell model, nuclear forces. *Revision and Test*

Name: Pardeep Kumar
Class: B.Sc. 6th Sem (SecA, B&C)Non med.
Paper code: Phy- 602
Subject Name: Nuclear Physics
Number of days: 1-6

07JAN – 31 JAN	Nuclear mass and binding energy, systematics nuclear binding energy, nuclear stability Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept) Determination of mass by Bain-Bridge, Bain-Bride and Jordan mass spectrograph, Determination of charge by Mosley law Determination of size of nuclei by Rutherford Back Scattering.
01 FEB – 09 MARCH	Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory Energy loss of heavy charged particle Energetics of alpha-decay, Range and straggling of alpha particles. Geiger-Nuttal law.Introduction of light charged particle (Beta-particle) Origin of continuous beta-spectrum (neutrino hypothesis) types of beta decay and energetics of beta decay, Energy loss of betaparticles (ionization), Range of electrons, absorption of beta-particles.
09 MARCH – 16 MARCH	***HOLI VACATIONS***
17 MARCH – 17 APRIL	Interaction of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passage of Gamma radiations through matter (photoelectric, compton and pair production effect) electron position neutrino hypothesis) types of beta decay and energetics of beta decay, Energy loss of betaparticles (ionization), Range of electrons, absorption of beta-particles. anhilation. Asborption of Gamma rays (Mass attenuation coefficient) and its application.Nuclear reactions, Elastic scattering, Inelastic scatting, Nuclear disintegration, photonuclear reaction Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and reaction threshold
18 APRIL – 05 MAY	Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors, (Principles, construction, working and use) Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators. Ionization chamber, proportional counter, G.M. counter detailed study, scintillation counter, Semiconductor detector. *Revision and Test*

Name: Mr. PARDEEP
Class: M.Sc-Physics, 2nd Sem
Paper code: 24PHY202DS03
Subject Name: Atomic & Molecular Physics
Number of days: 1-3

09 Jan -08 Feb	One Electron systems and Pauli principle: Quantum states of one electron atoms, atomic orbitals, Hydrogen spectrum, Pauli principle, spectra of alkali elements, spin orbit interaction and fine structure in alkali spectra, Spectra of two electron systems, equivalent and non equivalent electron
10 Feb- 08 March	The influence of external fields, Two electron system Hyperfine structure and Line broadening: Normal and anomalous Zeeman effect, Paschen Back effect, Stark effect, Two electron systems, interaction energy in LS and JJ coupling, Hyperfine structure (magnetic and electric, only qualitative)
09 March – 16 March	***HOLI VACATIONS***
17 March – 17 April	Diatomic molecules and their rotational spectra: Types of molecules, Diatomic linear symmetric top, asymmetric top and spherical top molecules, Rotational spectra of diatomic molecules as a rigid rotator, energy levels and spectra of non-rigid rotor, intensity of rotational lines
18 April -05 May	Vibrational and Rotational Vibration spectra of Diatomic molecules: Vibrational energy of diatomic molecule, Diatomic molecules as a simple harmonic oscillator, Energy levels and spectrum, Morse potential energy curve, Molecules as vibrating rotator, vibration spectrum of diatomic molecules, PQR Branches

Name: Mr. Vikas
Class: B.Sc.(Hons) 6th Sem
Paper code: Phy-604
Subject Name:*Physics of Materials-II*
Number of days: 1-3

.Week	**Syllabus covered**
07 JAN-31 JAN	Dielectric Properties of Materials. Polarization, Local electric field at an atom. Depolarization field, Lorentz fields of dipoles inside a cavity.
01 FEB- 9 MARCH	Dielectric constant and polrizability: Electric susceptibility,polarizability Clausius-Mosotti equation. Qualitative discussion of ferroelectric properties of materials P-E hysteresis loop, Qualitative description of free electron theory Inadequacies of free electron theory with reference to Halleffect and specific heat of electrons in a metal.
9MARCH-16MARCH	***HOLI VACATION***
17MARCH-17APRIL	Elementary band theory-Bloch theorem, Kronig-Penney model Difference between conductors, semiconductors and Insulators Band gaps
17APRIL-5 MAY	Effective mass of electron, concept of hole, Types of semiconductor Action conductivity in semiconductors Mobility of carriers (lattice & semiconductors (qualitative). *Revision and test*

Name: Mr. Vikas
Class: B.Sc.(Hons) 6th Sem
Paper code: Phy- 605
Subject Name: *Electronic devices: Physics and applications-II*
Number of days: 4-6

07 JAN – 31 JAN	Amplifiers – Only bipolar junction transistor, CB, CE and CC configurations, Singlestage CE amplifier (biasing and stabilization circuits, Q-point, equivalent circuit, inputimpedance, output impedance, voltage and current gain)
01 FEB – 08 MARCH	Class A, B. C amplifiers (definitions)RC coupled amplifiers (frequency response, Boe plot, amplitude and phase) Class B push-pull amplifier Feedback in amplifiers – Voltage feedback and current feedback Effect of negative voltage series feedback on input impedance, output impedance and gain, stability distortion and noise, Feedback in amplifiers cont….
09 MARCH -16 MARCH	***H0LI VACATION***
17 MARCH – 17 APRIL	Oscillators – barkhausen criterion, Colpitts, phase shift crystal oscillators. Multivibrators , Basic circuits of astable, bistable and monostable multivibrators, Multivibrators cont….
18 APRIL – 05 MAY	Multivibrator: Details of astable multivibrators (Derivation of time period). problems, Sweep circuits Sweep circuit usingtransistor as a switch and UJT (derivation of time period).*Revision and Test*

Name: Ms. Anju Rani
Class: B.Sc. 2nd Physics (Hons.) Semester-IV
Paper code: Phy- 401
Subject Name: Mathematical Physics-II
Number of days: Monday, Tuesday, Wednesday (1-3)

07JAN – 31 JAN	Gamma and Beta functions. Legendre, Hermite and Laguerre Polynomials: Rodrigues formulae, generating functions, recurrence relations, orthogonality. Series expansion of a function in terms of a complete set of Legendre functions.
01 FEB – 09 MARCH	Bessel functions: first and second kind. Generating function, recurrence formulas, zeros of Bessel functions and orthogonality. Fraunhofer diffraction integral for circular aperture. Problems and Test.
09 MARCH – 16 MARCH	***HOLI VACATIONS***
17 MARCH – 17 APRIL	General solution of wave equation in 1 dimension. Transverse vibration of stretched string. Oscillation of hanging chain. Wave equation in 2 and 3 dimensions. Vibrations of rectangular and circular membrane. Derivation of the equation of heat conduction. Derivation of the equation of heat conduction. Heat flow in one-two-and three dimensional rectangular systems of finite boundaries, Temperature inside circular plate. Test and assignment.
18 APRIL – 05 MAY	Laplace equation in Cartesian, cylindrical and spherical coordinate systems. Problems of steady flow of heat in rectangular and circular plate. Gravitational potential of a ring. *Revision and Test*

Name: Ms. Anju Rani
Class: B.Sc III(NM) 6th Sem, Sec (A, B and C)
Paper code: Phy- 601
Subject Name: Atomic, Molecular and Laser Physics
Number of days: 1-6

07JAN – 31 JAN	Vector atom model, quantum numbers associated with vector atom model, penetrating and non-penetrating orbits (qualitative description), spectral lines in different series of alkali spectra, spin orbit interaction and doublet term separation, LS or Russel-Saunder Coupling jj coupling (expressions for interaction energies for LS and jj coupling required), Zeeman effect (normal and Anomalous), Zeeman pattern of D1 and D2 lines of Na-atom.
01 FEB – 09 MARCH	Zeeman effect (normal and Anomalous), Zeeman pattern of D1 and D2 lines of Na-atom. Paschen Back effect of a single valence electron system, Weak field Stark effect of Hydrogen atom. Discrete set of electronic energies of molecules, assignment , quantization of Vibrational and rotational energies, Raman effect (Quantitative description), Stoke's and anti- Stoke's lines. Test.
09 MARCH – 16 MARCH	***HOLI VACATIONS***
17 MARCH – 17 APRIL	Main features of a laser : Directionality, high intensity, high degree of coherence, spatial and temporal coherence, Einstein's coefficients and possibility of amplification, momentum transfer, life time of a level, kinetics of optical absorption. Test and assignment.
18 APRIL – 05 MAY	Threshold condition for laser emission, Laser pumping, He-Ne laser and RUBY laser (Principle, Construction and Working). Applications of laser in the field of medicine and industry. *Revision and Test.*

Name: Dr. Sonu
Class: M.Sc-Physics, 2nd Sem
Paper code: 24PHY202DS01
Subject Name: Statistical Mechanics
Number of days: 4-6

01Feb-08 March	Phase space, Ensembles, Liouville theorem, conservation of extension, Equation of motion, Equal a priori probability, Statistical equilibrium, Micro -canonical ensemble, Quantization of phase space, classical limit, symmetry of wave functions effect of symmetry on counting, Various distributions using micro canonical ensemble
09 March – 16 March	***HOLI VACTIONS***
17 March – 17 April	Entropy of an ideal gas, Equilibrium Conditions, QuasiStatic Process, Entropy of an ideal gas using Micro canonical Ensemble, Gibbs paradox, SackurTetrode equation, Probability distribution and entropy of a two level system. Unit 2: Entropy of a system in contact with a reservoir, Canonical ensemble, Ideal gas in a canonical ensemble, Equipartition of energy, Third law of thermodynamics, Photons, Grand canonical ensemble, Ideal gas in Grand Canonical ensemble, Comparison of various ensembles, Quantum distribution using other ensembles
18 April - 17 May	Transition from classical statistical mechanics to quantum statistical mechanics, Indistinguishability and quantum statistics, identical particles and symmetry requirements, Bose Einstein statistics, Fermi Dirac statistics, Maxwell Boltzmann statistics. Bose Einstein Condensation, Thermal properties of B.E. gas, liquid Helium, Energy and pressure of F-D gas, Electrons in metals, Thermionic Emission, Saha Theory of Thermal Ionization
19 May – 31 May	Cluster expansion for a classical gas, Virial equation of state, Van der Waals gas, Phase transition of second kind, Ising Model, Bragg Williams Approximation, Ising Model in one and two dimensions, fluctuations in ensembles, Energy fluctuation in quantum statistics, Concentration fluctuation in quantum statistics, One dimensional random walk, Brownian motion.

Name: Dr. Sonu
Class: B.Sc. Physics (Hons) 6th Sem
Paper code: Phy-601
Subject Name: Mathematical Physics VI
Number of days: 1-3

.Week	Syllabus
07 Jan-07 Feb	Laplace transform, Transform of elementary functions, Derivatives and integrals, Unit step function, Periodic function, Translation substitution and convolution theorem, Solution of first and second order ordinary differential equations Solution of partial differential equations
08 Feb- 08 March	Convolution theorem, Solution of one dimensional diffusion and wave equations, Heat flow in an infinite and semi infinite rod. Evaluation of integrals using transforms.
09March-16Mach	**Holi Vacations**
17 March-17April	Fourier transform . Fourier integral theorem, Sine and cosine transforms.

18April- 5 May	Transformation of coordinates. Tensorial character of physical quantities. Symmetricand antisymmetric lasers, Contraction and differentiation, Pseudotensors, Kronecker and attemating tensors, Step function and Dirac delta function. *Revision and test*