LESSON PLAN (Session 23-24)

Semester –Odd

Department: Physics

Class : BSc I

Name of the faculty: Ms. Ruby

Paper code: B23-PHY-101

Nomenclature of the paper: Mechanics

Month	**Week**	**Topics to be covered**
July	21.07.23-22.07.23	Introduction
	24.07.23-29.07.23	One week workshop on Experimental techniques
August	31.08.23-05.08.23	Introduction to Gravitation, Law of gravitation, Superposition principle, Related Numericals
	07.08.23-12.08.23	Gravitational field and Gravitational potential, Shell Theorem
	14.08.23-19.08.23	Gravitational field and forces due to hollow sphere and solid sphere
	21.08.23-26.08.23	Gravitational potential due to hollow sphere and solid sphere, Central forces
	28.08.23-2.09.23	Motion of particle under central force , Introduction to Lagrangian and polar co ordinates
September	04.09.23-09.09.23	Reduction of two body problem to one body problem and its solution, Related Numericals
	11.09.23-16.09.23	Compound pendulum or physical pendulum in form of elliptical lamina and expression of time period
	18.09.23-23.09.23	Determination of g by means of Bar Pendulum , Normal modes, Normal co ordinates
	25.09.23-30.09.23	Normal modes of vibration for given spring mass system, possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass (m_o joined together with spring of

		spring constant k
October	02.10.23-07-10.23	Numerical related to coupled oscillations
	09.10.23-14.10.23	Revision and Sessional Test
	16.10.23-21.10.23	SEMINARS of UNIT 4
	23.10.23-28.10.23	SEMINARS of UNIT 1
	30.10.23-04.11.23	SEMINARS of UNIT 2
	06.10.23-10.11.23	SEMINARS of UNIT 3
Vacations	10.11.23-16.11.23	Diwali Vacations

EVEN SEMESTER

Paper Code: B23-PHY-201

Nomenclature of the Paper: Electricity, Magnetism and Electromagnetic waves

Month	Week	Topics to be covered
January	01.01.24-06.01.24	Gradient of a scalar and its physical significance
	08.01.24-13.01.24	Line, Surface and Volume integrals of a vector and their physical significance
	15.01,24-20.01.24	Flux of a vector field, Divergence and curl of a vector and their physical significance
	22.01.24-27.01.24	Gauss's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field
	29.01.24-03.02.24	Electrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field E from potential as gradient
February	05.02.24-10.02.24	Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law
	12.02.24-17.02.24	Applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume , Test of UNIT 1
	19.02.24-24.02.24	Biot-Savart law and its simple applications: straight

		wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment
	26.02.24-02.03.24	Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of B: curl and divergence
March	04.03.24-09.03.24	Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of B: curl and divergence
	11.03.24-16.03,24	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
	18.03.24-22.03.24	Relation between B, H and M, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory)
	23.03.24-31.03.24	Holi Vacations
April	01.04.24-06.04.24	Cycle of Magnetization, B-H curve and hysteresis loop
	08.04.24-13.04.24	Energy dissipation, Hysteresis loss and importance of Hysteresis Curve
	15.04.24-20.04.24	Test of UNIT 2
	22.04.24-27.04.24	SEMINARS of UNIT 1
	29.04.24-30.04.24	SEMINARS of UNIT 2
May	01.05.24 onwards	Examinations

LESSON PLAN (Session 23-24)

Semester –Odd

Department: Physics

Class : BSc II

Name of the faculty: Ms. Ruby

Paper code: PH-301

Nomenclature of the paper: Computer Programming and Thermodynamics

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Computer organization, Binary representation, Algorithm development, Flow charts and their interpretation.
	24.07.23-29.07.23	FORTRAN Preliminaries: Integer and floating point arithmetic expression, built in functions, executable and non-executable statements, input and output statements
August	31.08.23-05.08.23	Formats, IF, DO and GO TO statements, Dimension arrays
	07.08.23-12.08.23	Statement function and function subprogram.
	14.08.23-19.08.23	Print out of natural numbers, Range of the set of given numbers, Ascending and descending order
	21.08.23-26.08.23	Mean and standard deviation, Least square fitting of curve, Roots of quadratic equation, Product of two matrices
	28.08.23-2.09.23	Numerical integration (Trapezoidal rule and Simpson 1/3 rule). Test of UNIT 1 and 2
September	04.09.23-09.09.23	Second law of thermodynamics and statements, Carnot theorem, Absolute scale of temperature
	11.09.23-16.09.23	Absolute Zero, Derivation of Clausius-Clapeyron and Clausius latent heat equation, Entropy, T-S diagram, Nernst heat law, Clausius theorem,

	18.09.23-23.09.23	Calculations of entropy of reversible and irreversible processes, Development of Maxwell thermodynamical relations.
	25.09.23-30.09.23	Thermodynamic function: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them
October	02.10.23-07-10.23	Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables
	09.10.23-14.10.23	Revision and Sessional exams
	16.10.23-21.10.23	Phase diagram and triple point of a substance, Joule's free expansion, Joule-Thomson (Porous plug) experiment, Joule Thomson effect
	23.10.23-28.10.23	Liquefaction of gases, (air, hydrogen, helium), Solidifaction of He below 4K, Cooling by adiabatic demagnetization.
	30.10.23-04.11.23	Test of UNIT 3
	06.10.23-10.11.23	Test of Unit 4
Vacations	10.11.23-16.11.23	Diwali Vacations

EVEN SEMESTER

Paper Code: PHY-401

Nomenclature of the Paper: STATISTICAL MECHANICS

Month	Week	Topics to be covered
January	01.01.24-06.01.24	Probability and probability theorem, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, Micro-Macro states
	08.01.24-13.01.24	Constraints, Accessible states, Ensembles, Thermodynamical probability, general distribution of particles in compartments of different size

	15.01,24-20.01.24	Condition of equilibrium between two systems in thermal contact, β parameter
	22.01.24-27.01.24	Entropy and Probability, Boltzmann distribution law.
	29.01.24-03.02.24	Postulates of statistical physics, Phase space Division of Phase space into cells, three kinds of statistics, basic approach in three statistics, M. B. statistics applied to an ideal gas in equilibrium-energy distribution law (including evaluation of α and β) ,
February	05.02.24-10.02.24	speed distribution law & velocity distribution law. Expression for average speed, r m s speed, average velocity, r m s velocity, most probable energy & mean energy for Maxwellian distribution.
	12.02.24-17.02.24	Test of UNIT 1 and 2
	19.02.24-24.02.24	Classical vrs Quantum Statistics: Identical particles, Bose-Einstein Statistics, Fermi-Dirac statistics
	26.02.24-02.03.24	Application of B.E Statistics of Planck's radiation law, B.E. gas
March	04.03.24-09.03.24	M. B. Law as a limiting case of B.E. Degeneracy and B.E. Condensation
	11.03.24-16.03,24	F.D. gas, electron gas in metals, Zero point energy, Specific heat of metals and its solution.
	18.03.24-22.03.24	Test of UNIT 3
	23.03.24-31.03.24	Holi Vacations
April	01.04.24-06.04.24	Dulong and Petit law, Derivation of Dulong and Petit law from classical physics
	08.04.24-13.04.24	Specific heat at low temperature, Einstein theory of specific heat
	15.04.24-20.04.24	Criticism of Einstein theory, Debye model of specific heat of solids
	22.04.24-27.04.24	success and shortcomings of Debye, comparison of Einstein and Debye theory
	29.04.24-30.04.24	TEST of UNIT 4

May	01.05.24 onwards	Examinations

LESSON PLAN (Session 23-24)

Semester –Odd

Department: Physics

Class : BSc III

Name of the faculty: Ms. Ruby

Paper code: PH-501

Nomenclature of the paper: Quantum and Laser Physics

Month	Week	Topics to be covered
July	21.07.23-22.07.23	
	24.07.23-29.07.23	
August	31.08.23-05.08.23	Overview, scale of quantum physics, boundary between classical and quantum phenomena, Photon, Photoelectric effect
	07.08.23-12.08.23	Compton effect (theory and result), Frank-Hertz experiment, de-Broglie hypothesis, Davisson and Germer experiment, ·G.P. Thomson experiment. Phase velocity, group velocity and their relation. Heisenberg's uncertainty principle. Time energy and angular momentum, position uncertainty.
	14.08.23-19.08.23	Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope, Electron diffraction from a slit Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle). Time-independent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, concept of observer and operator. Expectation values of dynamical quantities, probability current density
	21.08.23-26.08.23	Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum,

		nodes and anti nodes, zero point energy). (ii) One dimensional step potential E > Vo (Reflection and Transmission coefficient) One dimensional step potential E < Vo (penetration depth calculation)
	28.08.23-2.09.23	One dimensional potential barrier, E > Vo (Reflection and Transmission coefficient) (v) One-dimensional potential barrier, E < Vo (penetration or tunneling coefficient). (vi) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, Zero-point energy, wave equation for ground state and excited states). Test of UNIT 1 and 2
September	04.09.23-09.09.23	Absorption and emission of radiation, Main features of a laser: Directionality, high intensity, high degree of coherence, spatial and temporal coherence
	11.09.23-16.09.23	Einstein's coefficients and possibility of amplification, momentum transfer, life time of a level
	18.09.23-23.09.23	kinetics of optical absorption (two and three level rate equation, Fuchbauer landerburg formula).population inversion: A necessary condition for light amplification, resonance cavity, laser pumping
	25.09.23-30.09.23	Threshold condition for laser emission, line broadening mechanism,
October	02.10.23-07-10.23	homogeneous and inhomogeneous line broadening (natural, collision and Doppler broadening).
	09.10.23-14.10.23	Revision and Sessional Exams
	16.10.23-21.10.23	He-Ne laser and RUBY laser (Principle, Construction and working)
	23.10.23-28.10.23	Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working)
	30.10.23-04.11.23	Applications of lasers in the field of medicine and industry

	06.10.23-10.11.23	Test of UNIT 3 and 4
Vacations	10.11.23-16.11.23	Diwali Vacations
EVEN SEMESTER		
Paper Code: PH-602 **Nomenclature of the Paper: Atomic and Molecular Spectroscopy**		
Month	Week	Topics to be covered
January	01.01.24-06.01.24	Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model(Bohr's postulates) , spectra of Hydrogen atom , explanation of spectral series in Hydrogen atom
	08.01.24-13.01.24	un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule
	15.01,24-20.01.24	de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory
	22.01.24-27.01.24	Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum
	29.01.24-03.02.24	spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules
February	05.02.24-10.02.24	Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic

		filed; Larmors' precession and theorem.
	12.02.24-17.02.24	Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits
	19.02.24-24.02.24	quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms
	26.02.24-02.03.24	observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum .
March	04.03.24-09.03.24	Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. Coupling Schemes;LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule
	11.03.24-16.03,24	principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons,
	18.03.24-22.03.24	comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.
	23.03.24-31.03.24	Holi Vacations
April	01.04.24-06.04.24	Zeeman Effect (normal and Anomalous),Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect(Lande g-factor), Zeeman pattern of D1 and D2 lines of Naatom, Paschen-Back effect of a single valence

		electron system. Weak field Stark effect of Hydrogen atom.
	08.04.24-13.04.24	General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region),
	15.04.24-20.04.24	Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra
	22.04.24-27.04.24	Revision of UNIT 1 and 2
	29.04.24-30.04.24	Revision of Unit 3 and 4
May	01.05.24 onwards	Examinations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: PHYSICS

Class : BSc I

Name of the faculty: Narinder Pal kaur

Paper code B23- PHY-101

Nomenclature of the paper: MECHANICS

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Introduction
	24.07.23-29.07.23	One week workshop on Experimental Skills
August	31.08.23-05.08.23	Rigid body, Moment of inertia, Radius of gyration, Theorem of perpendicular axis and theorem of parallel axis
	07.08.23-12.08.23	Moment of inertia of ring, Disc and annular disc Solid cylinder and hollow cylinder
	14.08.23-19.08.23	Moment of inertia of rectangular plate and triangular plate, Solid sphere and hollow sphere
	21.08.23-26.08.23	Rotational kinetic energy, angular momentum and law of conservation of angular momentum
	28.08.23-2.09.23	Fly wheel and moment of inertia of irregular body
September	04.09.23-09.09.23	Deforming force, elastic limit, stress, strain and Hooks law , modulus of rigidity, relation between angle of shear and strain
	11.09.23-16.09.23	Elastic energy stored in an elastic body, elongation produced in heavy rod, tension in rotating rod
	18.09.23-23.09.23	Elastic constants and relation between them
	25.09.23-30.09.23	Torque required for twisting cylinder and hollow shaft is much stronger than solid one
October	02.10.23-07-10.23	Bending of beam and moment, flexural rigidity cantilever and depression produced in centrally loaded beam
	09.10.23-14.10.23	REVISION and Sessional Test
	16.10.23-21.10.23	Theory of relativity and Michelson experiment
	23.10.23-28.10.23	Special theory of relativity and lorentz transformation, time dilation and length contraction
	30.10.23-04.11.23	Relativistic velocity and velocity addition , mass energy equivalence and Doppler effect
	06.10.23-10.11.23	Transformation of energy, momentum and force, problems of relativistic dynamics
Vacations	10.11.23-16.11.23	Diwali Vacations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: PHYSICS

Class : BSc II

Name of the faculty: Narinder Pal kaur

Paper code: PH-302

Nomenclature of the paper: WAVE and OPTICS-1

Month	Week	Topics to be covered
July	21.07.23-22.07.23	
	24.07.23-29.07.23	
August	31.08.23-05.08.23	Interference by division of wave front, definition of interference and basic conditions, coherence
	07.08.23-12.08.23	Youngs double slit experiment and theory of interference, fringe width and its expression
	14.08.23-19.08.23	Fresnels experiment and its application to determine wavelength and thickness of thin mica sheet
	21.08.23-26.08.23	Llyods mirror , difference between Biprism and Llyods mirror fringes, Stokes law
	28.08.23-2.09.23	Interference by division of amplitude, parallel thin films and production of colors
September	04.09.23-09.09.23	Interference at air wedge reflected and transmitted systems
	11.09.23-16.09.23	Newtons rings
	18.09.23-23.09.23	Michelson interferometer
	25.09.23-30.09.23	ASSIGNMENT OF UNIT1 AND UNIT2
October	02.10.23-07-10.23	Diffraction its types Fresnels and Fraunhoffer, diffraction at single slit
	09.10.23-14.10.23	Sessional test
	16.10.23-21.10.23	Diffraction at double slit and plane transmission grating
	23.10.23-28.10.23	Dispersive power and resolving power of grating and telescope
	30.10.23-04.11.23	Fresnels diffraction , half period zones and zone plate
	06.10.23-10.11.23	Diffraction at straight edge, narrow slit and circular slit
Vacations	10.11.23-16.11.23	Diwali Vacations

EVEN SEMESTER

,per Code: PHY-402 **Nomenclature of the Paper : WAVE AND OPTICS II**
EVEN SEM

Month	Week	Topics to be covered
January	01.01.24-06.01.24	Fourier theorem and Fourie series, evaluation of coefficients, importance and limitations
	08.01.24-13.01.24	Fourier theorem for even and odd functions, for different values of integration
	15.01,24-20.01.24	Complex form of Fourier series, its application to analysis of square wave triangular wave and rectifier
	22.01.24-27.01.24	Parsevals identity and Fourier integral theorem
	29.01.24-03.02.24	Assignment, problems and revision
February	05.02.24-10.02.24	Chromatic aberration complete
	12.02.24-17.02.24	Spherical aberration complete
	19.02.24-24.02.24	Coma, astigmatism and distortion
	26.02.24-02.03.24	Fourier transforms and its properties
March	04.03.24-09.03.24	Evaluation of integrals and solution for differential equations using transforms
	11.03.24-16.03,24	Matrix methods in paraxial optics, effect of translation and refraction
	18.03.24-22.03.24	Derivation of thick and thin lens, unit plane, nodal planes
	23.03.24-31.03.24	Holi Vacations
April	01.04.24-06.04.24	Polarisation by reflection, transmission ,scattering. Malus law
	08.04.24-13.04.24	Phenomenon of double refraction, Nicol prism
	15.04.24-20.04.24	Quarter wave plate and half wave plate their uses, production and detection of polarized light
	22.04.24-27.04.24	Fresnels theory of optical rotation and polarimeters
	29.04.24-30.04.24	Revision
May	01.05.24 onwards	Examinations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: PHYSICS

Class : BSc III

Name of the faculty: Narinder Pal kaur

Paper code: PH-502

Nomenclature of the paper: Nuclear Physics

Month	Week	Topics to be covered
July	21.07.23-22.07.23	
	24.07.23-29.07.23	
August	31.07.23-05.08.23	Nuclear composition, proton electron and proton neutron theories
	07.08.23-12.08.23	Nuclear stability, mass and binding energy, systematic of binding energy
	14.08.23-19.08.23	Nuclear size and nuclear charge and their determination by Rutherford scattering and Mosleys law
	21.08.23-26.08.23	Mass and its determination by BAIN BRIDGE SPECTROGRAPH, spin, parity, magnetic dipole moment and electric quadrupole moment
	28.08.23-2.09.23	Revision and assignment
September	04.09.23-09.09.23	Alpha decay and its theory, its energetics
	11.09.23-16.09.23	Beta decay, neutrino theory different types of beta decay and its energetics
	18.09.23-23.09.23	Gamma decay , its energetic , its applications
	25.09.23-30.09.23	Tandem accelerator and linear accelerator
October	02.10.23-07-10.23	Cyclotron and betatron
	09.10.23-14.10.23	Ionization chamber and proportional counter
	16.10.23-21.10.23	GM counter and scintillation counter, semiconductor detector
	23.10.23-28.10.23	Nuclear reactions conservation laws Q value and threshold reactions
	30.10.23-04.11.23	Nuclear reactors, nuclear fission and fusion
	06.10.23-10.11.23	Revision
Vacations	10.11.23-16.11.23	Diwali Vacations

Paper Code: PHY-502 Nomenclature of the Paper : Solid state and Nano physics

EVEN SEM

Month	Week	Topics to be covered
January	01.01.24-06.01.24	Supercoductivity survey and system, High TC Super conductors
	08.01.24-13.01.24	Isotopic effect , critical magnetic field, Meissners effect, type I and typeII superconductors
	15.01,24-20.01.24	Londons equation and Peppards theory, BCS theory
	22.01.24-27.01.24	Josephson effect both and application of superconductivity
	29.01.24-03.02.24	Assignment and revision
February	05.02.24-10.02.24	Crystalline and glossy forms, liquid crystals, periodicity, lattice and basis , translational vectors and axes
	12.02.24-17.02.24	Unit cell, primitive cell, Winger cell, symmetry operations, Miller indices and inter planer spacing
	19.02.24-24.02.24	Bravias lattices in two and three dimensions
	26.02.24-02.03.24	Diamond, sodium chloride and zinc sulphide crystals
March	04.03.24-09.03.24	Xray diffraction, Braggs law and experimental methods
	11.03.24-16.03,24	K space and reciprocal lattice to scc ,bcc and fcc crystals
	18.03.24-22.03.24	Assignment and revision
	23.03.24-31.03.24	Holi Vacations
April	01.04.24-06.04.24	Nano scale and technology and its history
	08.04.24-13.04.24	Benefits and challenges in molecular manufacturing
	15.04.24-20.04.24	Vision and objectives, applications in different fields
	22.04.24-27.04.24	Assignment and problems
	29.04.24-30.04.24	Revision
May	01.05.24 onwards	Examinations