LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc I NM

Subject:- PHY 101 : Mechanics

Weeks	Topic Covered
	Introduction to paper
	Mechanics of single and system of particles.
Ist Week	Numerical Problems
	Conservation of law of linear momentum.
	Conservation of law Angular momentum
2nd Week	Numerical Problems
	Conservation of Mechanical energy.
	Numerical Problems
3rd Week	,Centre of mass and equation of motion
	Numerical problems
	Constrained motion
4th Week	Degrees of freedom
	Students Problems related to Unit 1
	Generalized coordinates, displacement, velocity
5th Week	Numerical problems
	Generalized acceleration, momentum.
	Numerical problems
6th Week	Generalized force and potential.
	Unit-1 (Internal Assessment- Test)
	Hamilton's variational principle
7th Week	Lagrange's equation of motion from Hamilton's Principle.
	Linear Harmonic oscillator,
	simple pendulum,
8th Week	Atwood's machine.
	Numerical Problems from Unit-2
	Numerical Problems from Unit-2
9th Week	Students problems related to Unit-2
	Rotation of Rigid body
	Moment of inertia.
10th Week	Numerical problems
	Torque, angular momentum
	Numerical problems
11th Week	Kinetic energy of rotation.
	. Unit-2 (Internal Assessment- Test)
13th Week	Theorems of perpendicular and parallel axes with proof

	Moment of inertia of solid sphere
	Moment of inertia of Hollow sphere and Spherical shell.
	Moment of inertia of solid cylinder, hollow cylinder
14th Week	Moment of Inertia solid bar of rectangular cross-section.
	Acceleration of a body rolling down on an inclined plane.
	Numerical Problem Unit-3
15th Week	Numerical Problem Unit-3
	Discussion previous Year question paper
	Test
16th Week	Test

LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc I NM

Subject:- PHY 102 : ELECTRICITY AND MAGNETISM

Weeks	Topic Covered
	Introduction to paper
	Mathematical Background : Scalars and Vectors, dot and cross product,
Ist Week	Triple vector product
	Numericals
2nd	Differentiation of a vector,
Week	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
3rd Week	Stocks theorem.
	Electrostatic Field
4th	Derivation of field E from potential as gradient,
Week	Derivation of Laplace and Poisson equations.
	Electric flux
	Gauss's Law and its application to spherical shell,
5th Week	uniformly charged infinite plane and uniformity charged straight wire, mechanical force of charged surface,
	Energy per unit volume.
6th	Magnetostatics Magnetic Induction, magnetic flux,
Week	Test
	Numericals
7th	Unit solenoidal nature of Vector field of induction.
Week	Properties of B
	Electronic theory of Dia and para magnetism (Langevin's theory).
	Domain theory of ferromagnetism.
8th Week	Cycle of Magnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance of Hysteresis curve).
	Contt.. Cycle of Magnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance of Hysteresis curve).
	Discussion on previous years question from unit II
9th Week	Test
	Unit III Electromagnetic Theory
10th	Maxwell equation and their derivations,
Week	Contt.. Maxwell equation and their derivations,
	Contt.. Maxwell equation and their derivations,
11th	Test
Week	Displacement Current.
	Vector and scalar potentials,

13th Week	Contt. Vector and scalar potentials,
	boundary conditions at interface between two different media,
14th Week	contt boundary conditions at interface between two different media,
	Contt. boundary conditions at interface between two different media,
	Contt boundary conditions at interface between two different media,
15th Week	Propagation of electromagnetic wave (Basic idea, no derivation).
	Poynting vector and Poynting theorem.
	Discusssion previous Year question paper
16th Week	Discusssion previous Year question paper
	Test
	Test

LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc II NM

Subject:- Physics Computer programming and thermodynamics PHY 301

Weeks	Topic Covered
1st Week	**Lecture 1**: Unit-I : Computer Programming: Computer organization, Binary representation **Lecture 2**: Algorithm development, **Lecture 3**: flow charts and their interpretation.
2nd Week	**Lecture 4**: Flowchart and algorithm-based problems **Lecture 5** :Fortran Preliminaries: Integer and floating point arithmetic expression, **Lecture 6**: built in functions executable and non-executable statements, input and output statements,
3rd Week	**Lecture 7**: Formats, **Lecture 8**: I.F.and GO TO statements, **Lecture 9**: Do statement
4th Week	**Lecture 10**: Dimension, arrays statement **Lecture 11**: Function and function subprogram. **Lecture 12**: Test
5th Week	**Lecture 13:** Unit-II Thermodynamics-I : Second law of thermodynamics, **Lecture 14:** Carnot theorem, Absolute scale of temperature, **Lecture 15 :** test
6th Week	**Lecture 16:** Absolute Zero, **Lecture 17:** Entropy, show that dQ/T=O, T-S diagram Nernst heat law, **Lecture 18:** Joule's free expansion, Joule Thomson (Porous plug) experiment. Joule - Thomson effect.
7th Week	**Lecture 19:** Liquefication of gases. **Lecture 20:** Liquification of gases Contt. **Lecture 21:** Test
8th Week	**Lecture 22:** Air pollution due to internal combustion Engine.

	Lecture 23 :Unit III- Thermodynamics-II : Derivation of Clausius – Claperyron Equation latent heat equation **Lecture 24 :test**
9th Week	**Lecture 25:**. Phase diagram **Lecture 26:** triple point of a substance. **Lecture 27 :** test
10th Week	**Lecture 28:** Development of Maxwell thermodynamical relations. **Lecture 29: contt.** Development of Maxwell thermodynamical relations. **Lecture 30:** Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables.
11th Week	**Lecture 31:** Test **Lecture 32:** Thermodynamic functions Lecture 33: Internal energy (U),
12th Week	**Lecture 34:** Helmholtz function (F), **Lecture 35:** Enthalpy (H), **Lecture 36** Gibbs function (G)
13th Week	**Lecture 37, 38,39:** Relations between thermodynamics function.
14th Week	**Lecture 40, 41,42:** Application of maxwell equations
15th Week	**Lecture 43:** Discussion of previous year papers **Lecture 44:** Test

LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc II NM

Subject:- Optics – I ,PHY 302

Weeks	Topic Covered
1st Week	**Lecture 1:** Unit-I: Fourier Analysis and Fourier Transforms : Speed of transverse waves on a uniform string. **Lecture 2:** Speed of longitudinal waves in a fluid **Lecture 3:** superposition of waves (physical idea)
2nd Week	**Lecture 4:** Fourier Analysis of complex waves **Lecture 5:** Fourier Analysis application for the solution of triangular **Lecture 6:** : Fourier Analysis rectangular waves,
3rd Week	**Lecture 7: Application of Fourier analysis to** half wave rectifier output **Lecture 8** : **Application of Fourier analysis to** full wave rectifier out puts. **Lecture 9**: Test
4th Week	**Lecture 10:** Fourier transforms and its properties. **Lecture 11:** Application of fourier transform to following function. f(x) = $e^{-x^2/2}$ **Lecture 12:** Application of fourier transform to following function. f(x) = 1 [x] <a 0 [x] >a
5th Week	**Lecture 13: Unit II Geometrical optics : Introduction to** Geometrical Optics :

	Lecture 14: Matrix methods in paraxial optics, **Lecture 15: Metrix method for** translation
6th Week	**Lecture 16: Metrix method for** refraction **Lecture 17 :** derivation of thin lens using matrix method, **Lecture 18:** thick lens formulae using matrix method,
7th Week	**Lecture 19: Test** **Lecture 20:** unit plane, nodal planes, **Lecture 21:** system of thin lenses,
8th Week	**Lecture 22:** Chromatic, **Lecture 23:** spherical **Lecture 24:** coma,
9th Week	**Lecture 25:** astigmatism and **Lecture 26:** distortion aberrations and their remedies. **Lecture 27:** Test
10th Week	**Lecture 28:** Unit Interference : Introduction to Interference **Lecture 29:** Interference by Division of Wavefront : **Lecture 30:**Young's Double slit Experiment
11th Week	**Lecture 31:** Test **Lecture 32:** Fringe width in Young's Double slit experiment functions **Lecture 33:** Interference of white light vs monochromatic light and law of conservation of energy in interference

12th Week	**Lecture 34 :** Fresnel's Biprism **Lecture 35:** Applications of Fresnel's Biprism in determination of wavelength of sodium light **Lecture 36:** Test
13th Week	**Lecture 37:** Application of Frenel's Bi-prism in determination of thickness of mica sheet, **Lecture 38:** Lioyd's mirror, **Lecture 39:** phase change on reflection.
14th Week	**Lecture 40:** Difference Between interference by Liyod mirror and Frsenel's Bi-prism **Lecture 41:** Discussion of previous year papers **Lecture 42:** Test
15th Week	**Lecture 43:** Discussion of previous year papers **Lecture 44:** Test **Lecture 45:** Discussion on test

LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc III NM

Subject:- SOLID STATE PHYSICS ,PHY 501

Weeks	Topic Covered
Ist Week	Crystalline and glassy forms, liquid crystals
	Crystal structure, periodicity, lattice, and basis
	Crystal translational vectors
2nd Week	Crystal translational axes
	Unit cell and primitive cell
	Winger Seitz primitive Cell
3rd Week	Numerical on unit 1
	Symmetry operations for a two-dimensional crystal
	Bravais lattices in two dimensions
4th Week	Bravais lattices in three dimensions
	Contt: Bravais lattices in three dimensions
	TEST
5th Week	Crystal planes
	Contt: Crystal Planes
	Miller indices
6th Week	Numericals on Miller indices
	Formation of Interplanar spacing
	Numericals on interplaner spacing
7th Week	Crystal structures of Zinc sulphide
	Crystal structures of Sodium Chloride
	Crystal structures of Diamonds.
8th Week	X-ray diffraction
	Bragg's Law
	Numericals on Bragg's Law
9th Week	Experimental x-ray diffraction methods
	K-space
	TEST
10th Week	Reciprocal lattice and its physical significance
	Reciprocal lattice vectors
	Reciprocal lattice to a simple cubic lattice
11th Week	Reciprocal lattice to B C C
	Reciprocal lattice to F C C
	Relation between three lattices
13th Week	Numericals
	Test
	Introduction to specific heat of solids
14th Week	Dulong and Pettit’s law of specific heat of solids and its drawbacks

	Einstein's theory of specific heat
	Drawbacks of Einstein theory of specific heat
	Debye model of specific heat of solids.
	Comparison of three theories of specific heats of solids.
15th Week	Test
	Previous year question paper discussion
	Previous year question paper discussion
16th Week	Test

LESSON PLAN

Session – 2023-24 (odd semester)

Class & Section:- B. Sc III , NM

SUBJECT: QUANTUM MECHANICS , : PHY 502

Weeks	Topic Covered
Ist Week	Introduction to paper
	Failure of (Classical) E.M. Theory,
	quantum theory of radiation (old quantum theory)
2nd Week	Photon, photoelectric effect and Einstein's photoelectric equation
	Compton Effect theory
	Contt : Compton Effect discussion on result
3rd Week	Numericals on Compton Effect
	Test
	Inadequacy of old quantum theory, de-Broglie hypothesis
4th Week	Davisson and Germer experiment
	G.P. Thomson experiment
	Phase velocity and group velocity
5th Week	Heisenberg's uncertainty principle
	Time-energy
	Angular momentum
6th Week	position uncertainty, Uncertainty principle
	de-Broglie wave, (wave-particle duality).
	Gamma Ray Microscope
7th Week	Electron diffraction from a slit
	TEST
	Derivation of time dependent Schrodinger wave equation
8th Week	Derivation of time- independent Schrodinger wave equation
	Discussion of Schrodinger wave equation
	Eigen values, Eigen functions, wave functions and its significance.
9th Week	Normalization of wave function
	concept of observable and operator
	Solution of Schrodinger equation
10th Week	equation for harmonic oscillator excited states
	equation for harmonic oscillator ground states
	Application of Schrodinger equation in the solution of the following one-dimensional problems
11th Week	Schrodinger equation in the solution of the following 2-dimensional problems
	Discussion of Schrodinger equation in the solution of the following 2-dimensional problems

	Free particle in one dimensional box
13th Week	Free particle in two dimensional box
	Free particle in three dimensional box
	Problem class
14th Week	solution of Schrödinger wave equation, Eigen function, Eigen values
	solution of Schrödinger wave equation quantization of energy and momentum
	solution of Schrödinger wave equation nodes and antinodes, zero point energy
15th Week	One-dimensional potential barrier E>V0 (Reflection and Transmission coefficient.
	One-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage coefficient, penetration depth).
	Discussion previous Year question paper
16th Week	Discussion previous Year question paper
	Test
	Test