LESSON PLAN

Session – 2023-24 (even semester)

Class & Section: - B. Sc. 1st Year (2nd Sem.) Non-Medical

Subject & Name of Paper: - Physics: Properties of Matters, Kinetic Theory and Relativity (Paper Code: PHY 201)

Weeks	Topic Covered
Ist Week	Introduction to Properties of Matter Elasticity
	Hooke's law
	Elastic constants and their relations
2nd Week	Poisson's ratio
	Torsion of cylinder and twisting couple
	Bending of beam (bending moment and its magnitude)
3rd Week	Cantilevers, centrally loaded beam
	Kinetic Theory of Gases
	Assumptions of Kinetic Theory of gases
4th Week	Law of equipartition of energy
	Applications for specific heats of gases
	Test
5th Week	Maxwell distribution of speeds
	Maxwell distribution of velocities
	Derivation of Maxwell distribution of speeds
6th Week	Derivation of Maxwell distribution of Velocities
	Experimental verification of Maxwell's Law of speed distribution
	cont. Experimental verification of Maxwell's Law of speed distribution
7th Week	Most probable speed & Problems
	Average speed & Problems
	R.m.s. speed & Problems
8th Week	Mean free path Lecture
	Transport of energy Lecture
	Transport of momentum
9th Week	Diffusion of gases
	Brownian motion (qualitative)
	Real gases
10th Week	Van der Waal's equation
	Test

	Reference systems,
	Inertial & Non-Interial frames,
	Galilean invariance
11th Week	Conservation laws,
	Newtonian relativity principle
	Michelson - Morley experiment
13th Week	Test
	Lorentz transformations
	length contraction, time dilation
14th Week	velocity addition theorem
	Continued velocity addition theorem
	variation of mass with velocity
15th Week	Mass energy equivalence
	Discussion on Assignment & Numerical Problems
	Test
16th Week	Test

LESSON PLAN

Session – 2023-24 (even semester)

Class & Section:- B. Sc I NM

Subject & Name of Paper:- Physics: Electromagnetic Induction and Electronic Devices

(Paper Code: PHY 202)

Weeks	Topic Covered
Ist Week	Electromagnetic Induction: Growth and decay of current in a circuit with (a) Capacitance and resistance
	Growth and decay of current in a circuit with (b) resistance and inductance
	Growth and decay of current in a circuit with (c) Capacitance and inductance (d) Capacitance resistance and inductance.
2nd Week	AC circuit analysis using complex variables with (a) capacitance and resistance,
	(b) resistance and inductance (c) capacitance and
	inductance (d) capacitance, inductance and resistance
3rd Week	Series and parallel resonant circuit. Quality factor (Sharpness of resonance)
	Test
	Semiconductor Diodes , Energy bands in solids.
4th Week	Intrinsic and extrinsic semiconductor, Hall effect,
	P-N junction diode and their V-I characteristics. Zener and avalanche breakdown.
	Resistance of a diode, Light Emitting diodes (LED).
5th Week	Photo conduction in semiconductors
	photodiode,
	Solar Cell.
6th Week	Diode Rectifiers , P-N junction half wave
	full wave rectifier
	Types of filter circuits (Land - with theory).
7th Week	Zener diode as voltage regulator,
	simple regulated power supply.
	Transistors Junction Transistors,
8th Week	Bipolar transistors,
	working of NPN and PNP transistors,
	Transistor connections (C-B,
9th Week	C-E, C-C mode), constants of transistor
	Transistor characteristic curves (excluding h parameter analysis),

	advantage of C-B configuration.
10th Week	C.R. O. (Principle, construction and working in detail).
	Test
	Transistor Amplifers , Transistor biasing, methods of Transistor biasing
11th Week	D.C. load line. Common-base and common-emitter transistor biasing.
	Common-base, common- emitteer amplifers. Classification of amplifers
	Resistance-capacitance (R-C) coupled amplifer (two stage;
13th Week	concept of band width, no derivation).
	Feed-back in amplifers, advantage of negative feedback Emitter
	Oscillators
14th Week	Principle of Oscillation, Classification of Oscillator.
	Condition for self-sustained oscillation
	Barkhousen Criterion for oscillations.
15th Week	Tuned collector common emitter oscillator.
	Hartley oscillator. Colpitts's oscillator
	Test
16th Week	Discussion on Assignment
	Hands on Numerical Problems
	Test

LESSON PLAN

Session – 2023-24 (even semester)

Class & Section:- B. Sc II NM

Subject :- Statistical Mechanics PHY-401

Weeks	Topic Covered
1st Week	**Lecture 1**: Unit-I : Introduction: Probability **Lecture 2**: some probability considerations **Lecture 3** : Combinations possessing maximum probability
2nd Week	**Lecture 4**: combinations possessing minimum probability **Lecture 5** : Distribution of molecules in two boxes **Lecture 6**: **:** Case with weightage (general).
3rd Week	**Lecture 7** : Phase space **Lecture 8**: microstates and macrostates **Lecture 9**: statistical fluctuations
4th Week	**Lecture 10**: constraints and accessible States **Lecture 11**: Thermodynamical probability **Lecture 12**: Numericals of unit-1
5th Week	**Lecture 13:** Revision of unit -1 **Lecture 14:** Test of unit -1 **Lecture 15 :** Postulates of Statistical Physics
6th Week	**Lecture 16:** Division of Phase space into cells **Lecture 17:** Condition ofequilibrium between two system in thermal contact **Lecture 18:** Entropy and Probability
7th Week	**Lecture 19:** Boltzmann's distribution law **Lecture 20:** Boltzmann's distribution law **(contd.)** **Lecture 21:** Evaluation of A and b

8th Week	**Lecture 22:** Bose-Einstein statistics **Lecture 23 :** Bose-Einstein statistics (contd) **Lecture 24 :** Application of B.E. Statistics to Planck's radiation law
9th Week	**Lecture 25:** B.E. gas. **Lecture 26:** B.E. gas (contd.) **Lecture 27 :** Numerical of unit 2
10th Week	**Lecture 28:** Revision of unit-2 **Lecture 29:** Test of unit-2 **Lecture 30:** Fermi-Dirac statistics (intro.)
11th Week	**Lecture 31:** Fermi-Dirac statistics (contd.) **Lecture 32:** M.B. Law as limiting case of B.E. statistics **Lecture 33**: Degeneracy
12th Week	**Lecture 34:** B.E. Condensation **Lecture 35:** B.E. Condensation (contd.) **Lecture 36:** Fermi- Dirac Gas
13th Week	**Lecture 37 :** Fermi- Dirac Gas (contd.) **Lecture 38 :** Electron gas in metals **Lecture 39** : Electron gas in metals (contd.)
14th Week	**Lecture 40**: Zero point energy **Lecture 41**: Specific heatof metals and its solution **Lecture 42:** Numerical of unit 3
15th Week	Discussion on Previous year question paper test
16th Week	**Revison and test**

LESSON PLAN

Session – 2023-24 (even semester)

Class & Section:- B. Sc II NM

Subject :- Optics II, PHY-402

Weeks	Topic Covered
	Introduction
	Interference by Division of Amplitude
Ist Week	Interference by Division of Amplitude and thin film and Color of thin films
	wedge shaped film(contd.)
	wedge shaped film(contd.)
2nd Week	Newton's rings
	Newton's rings Contd.
	Numericals on Newton rings
3rd Week	Interferometers Michelson's interferometer
	Michelson's interferometer for Standardization of a meter
	Michelson's interferometer for determination of wave length
4th Week	Fresnel's Diffraction (introduction)
	Fresnel's half period zones
	zone plate,
5th Week	diffraction at a straight edge
	rectangular slit and circular aperture.
	Diffraction at circular aperture
6th Week	Unit test
	Fraunhofer diffraction(introduction)
	One-slit diffraction
7th Week	Two-slit diffraction
	N-slit diffraction,
	Numericals
8th Week	Plane transmission granting spectrum
	Dispersive power of a grating
	Limit of resolution
9th Week	Rayleigh's criterion
	resolving power of telescope and a grating
	test
10th Week	Introduction to wave nature of light
	Polarisation and Double Refraction
	Polarisation by reflection
11th Week	Polarisation by scattering
	Malus law, Phenomenon of double refraction
	Huygen's wave theory of double refraction (Normal and oblique incidence)
13th Week	Analysis of Polarized light
14th Week	Nicol prism

	Quarter wave plate and half wave plate
	production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii)Elliptically polarized light,
	Optical activity, Fresnel's theory of rotation
	Specific rotation, Polarimeters (half shade and Bi-quartz).
15th Week	Discussion previous Year question paper
	Test
	Test
16th Week	Test

LESSON PLAN

Session – 2023-24 (even semester)

Class &Section:-B. Sc III NM

Subject:-Physics ATOMIC AND MOLECULAR AND LASER PHY 601

Weeks	Topic Covered
1st Week	**Lecture 1**: Unit-I : Vector atom model **Lecture 2**: Quantum numbers associated with vector atom model **Lecture 3**: Penetrating orbits (qualitiative description)
2nd Week	**Lecture 4**: Non- penetrating orbits (qualitiative description) **Lecture 5** : Spectral lines in different series of ailkali spectra **Lecture 6**: Continue (Spectral lines in different series of ailkali spectra)
3rd Week	**Lecture 7**: Spin orbit interactionand doublet term separation **Lecture 8**: LS or Russel-Saunder Coupling (expressions for interaction energies) **Lecture 9**: JJ Coupling (expressions for interaction energies)
4th Week	**Lecture 10**: Zeeman effect (normal and Anormalous) **Lecture 11**: Zeeman pattern of D 1 and D2 lines of Na-atom **Lecture 12**: Test
5th Week	**Lecture 13:** Paschen, Back effect of a single valence electron system **Lecture 14:** Weak field Strak effect of Hydrogen atom

	Lecture 15 : test
6th Week	**Lecture 16:** Diseete set of electronic energies of molecules **Lecture 17:** Quantisation of Vibrational energies **Lecture 18:** Quantisation of ratiationalenergies
7th Week	**Lecture 19:** Raman effect (Quantitative description) **Lecture 20:** Stoke's lines **Lecture 21:** Test
8th Week	**Lecture 22:** Anti Stoke's lines **Lecture 23 :** Main features of a laser : Directionality, high intensity **Lecture 24 :test**
9th Week	**Lecture 25:**. High degree of coherence **Lecture 26:** Spatial and temporal coherence **Lecture 27 :** test
10th Week	**Lecture 28:** Einstein's coefficients **Lecture 29:** Possibility of amplification **Lecture 30:** Momentum transfer, life time of a level
11th Week	**Lecture 31:** Test **Lecture 32:** Kinetics of optical obsorption Lecture 33: Threshold condition for laser emission
12th Week	**Lecture 34:** Laser pumping **Lecture 35:** He-Ne laser (Principle, Construction and Working). **Lecture 36** RUBY laser (Principle, Construction and Working).

13th Week	**Lecture 37, 38,39:** Applications of laser in the field of medicine and industry.
14th Week	**Lecture 40, 41,42:** Discussion of previous year papers
15th Week	**Lecture 43:** Discussion of previous year papers **Lecture 44:** Test

LESSON PLAN

Session – 2023-24 (even semester)

Class &Section:- B. Sc III NM

Subject:-NUCLEAR PHYSICS ,PHY 602

Weeks	Topic Covered
1st Week	**Lecture 1:** Nuclear mass and binding energy **Lecture 2:** Systematics nuclear binding energy **Lecture 3:** Nuclear stability
2nd Week	**Lecture 4:** Detail discussion of Nuclear size **Lecture 5:** Nuclear spin, parity **Lecture 6:** : Statistics magnetic dipole moment, quadrupole moment (shape concept)
3rd Week	**Lecture 7:** Determination of mass by Bain-Bridge **Lecture 8** : Bain-Bride and Jordan mass spectrograph **Lecture 9**: Test
4th Week	**Lecture 10:**. Determination of charge by Mosley law **Lecture 11:** Determination of size of nuclei by Rutherford Back Scattering **Lecture 12:** Interaction of heavy charged particles (Alpha particles)
5th Week	**Lecture 13:** Alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula) **Lecture 14:** Energetics of alpha-decay, Range and straggling of alphaparticles **Lecture 15:** Geiger-Nuttal law

6th Week	**Lecture 16:** Introduction of Beta-particle, Origin of continuous beta-spectrum (neutrino hypothesis). **Lecture 17 :** Types of beta decay and energetics of beta decay **Lecture 18:** Energy loss of beta- particles (ionization), Range of electrons, absorption of beta-particles
7th Week	**Lecture 19: Test** **Lecture 20:** Interaction of Gamma Ray, Nature of gamma rays **Lecture 21:** Energetics of gamma rays, passage of Gamma radiations through matter by photoelectric effect.
8th Week	**Lecture 22:** Energetics of gamma rays, passage of Gamma radiations through matter by compton effect **Lecture 23:** Energetics of gamma rays, passage of Gamma radiations through matter by pair production effect **Lecture 24:** Asborption of Gamma rays (Mass attenuation coefficient) and its application
9th Week	**Lecture 25:** Nuclear reactions, Elastic scattering **Lecture 26:** Inelastic scatting, Nuclear disintegration **Lecture 27:** Test
10th Week	**Lecture 28:** Photoneuclear reaction, Radiative capture **Lecture 29:** Direct reaction, heavy ion reactions and spallation Reactions **Lecture 30:** Conservation laws. Q-value and reaction threshold

11th Week	**Lecture 31:** Test **Lecture 32:** Nuclear Reactors General aspects of Reactor design **Lecture 33:** Nuclear fission and fusion reactors (Principles, construction, working and use)
12th Week	**Lecture 34 :** Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators **Lecture 35:** Ionization chamber, proportional counter. **Lecture 36:** Test
13th Week	**Lecture 37:** G.M. counter detailed study **Lecture 38:** Scintillation counter and semiconductor detector
14th Week	**Lecture 39:** Test
15th Week	**Lecture 40:** Discussion of previous year papers **Lecture 41:** Test **Lecture 42:**Discussion on test