

**Govt. College for Women Lakhan Majra, Rohtak**  
**Lesson Plan (Even Semester 2023-24)**

**Name of Assistant Professor: Dr. Anjali Maan**

**Class: - B.Sc. 2<sup>nd</sup> Semester**

**Subject: Physics**

**Paper II – PHY-202: Electro Magnetic Induction and Electronic Devices**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	Electromagnetic Induction : 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. AC circuit analysis using complex variables with (a) capacitance and resistance, (b) resistance and inductance (c) capacitance and inductance (d) capacitance, inductance and resistance Series and parallel resonant circuit. Quality factor (Sharpness of resonance).
2.	February 2024	Semiconductor Diodes: Energy bands in solids. 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). Photo conduction in semiconductors, photodiode, Solar Cell. Diode Rectifiers: P-N junction half wave and full wave rectifier. Types of filter circuits (L and - with theory). Zener diode as voltage regulator, simple regulated power supply. Transistors: Junction Transistors, Bipolar transistors, working of NPN and PNP transistors, Transistor connections (C-B, C-E, C-C mode), constants of transistor
3.	March 2024	Transistor characteristic curves (excluding h parameter analysis), advantage of C-B configuration. C.R. O. (Principle, construction and working in detail). Transistor Amplifiers: Transistor biasing, methods of Transistor biasing and stabilization. D.C. load line. Common-base and common-emitter transistor biasing. Common-base, common-emitter amplifiers. Classification of amplifiers. Resistance-capacitance (R-C) coupled amplifier (two stage; concept of band width, no derivation).
4.	April 2024	Feed-back in amplifiers, advantage of negative feedback Emitter follower. Oscillator: Oscillators, Principle of Oscillation, Classification of Oscillator. Condition for self sustained oscillation: Barkhausen Criterion for oscillations. Tuned collector common emitter oscillator. Hartley oscillator, Colpitt's oscillator.

**Govt. College for Women Lakhan Majra, Rohtak**  
**Lesson Plan (Even Semester 2023-24)**

**Name of Assistant Professor: Dr. Anjali Maan**

**Class: - B.Sc. 4<sup>th</sup> Semester**

**Subject: Physics**

**Paper II – PHY-402: Optics - II**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	Interference by Division of Amplitude: Colour of thin, films, wedge shaped film, Newton's rings. Interferometers: Michelson's interferometer and its application to (I) Standardisation of a meter (II) determination of wave length. Fresnel's Diffraction : Fresnel's half period zones, zone plate, diffraction at a straight edge, rectangular slit and circular aperture.
2.	February 2024	Fraunhofer diffraction : One slit diffraction, Two slit diffraction N-slit diffraction, Plane transmission grating spectrum, Dispersive power of a grating , Limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Polarization: Polarisation and Double Refraction : Polarisation by reflection,
3.	March 2024	Polarisation by scattering, Malus law, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence). Analysis of Polarised light Nicol prism, Quarter wave plate and half wave plate.
4.	April 2024	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 Biquartz).

**Govt. College for Women Lakhan Majra, Rohtak**  
**Lesson Plan (Even Semester 2023-24)**

**Name of Assistant Professor: Dr. Anjali Maan**

**Class: - B.Sc. 6<sup>th</sup> Semester**

**Subject: Physics**

**Paper I – PHY-601: Atomic Molecular and Laser Physics**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	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-Saunders Coupling, jj coupling (expressions for interaction energies for LS and jj coupling required)
2.	February 2024	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, quantisation of Vibrational and rotational energies Raman effect (Quantitative description) Stoke's and anti Stoke's lines.
3.	March 2024	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. Threshold condition for laser emission, Laser pumping, He-Ne laser and
4.	April 2024	RUBY laser (Principle, Construction and Working). Applications of laser in the field of medicine and industry

**Govt. College for Women Lakhan Majra, Rohtak**  
**Lesson Plan (Even Semester 2023-24)**

**Name of Assistant Professor: Dr. Sunil Dhankhar**

**Class: - B.Sc. 2<sup>nd</sup> Semester**

**Subject: Physics**

**Paper I – PHY-201: Properties of Matter, Kinetic Theory and Relativity**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	Properties of Matter (Elasticity): Elasticity, Hooke's law, Elastic constants and their relations, Poisson's ratio, torsion of cylinder and twisting couple. Bending of beam (bending moment and its magnitude) cantilevers, Centrally loaded beam.
2.	February 2024	Kinetic Theory of Gases: Assumptions of Kinetic Theory of gases, Law of equipartition of energy and its applications for specific heats of gases. Maxwell distribution of speeds and velocities (derivation required), Experimental verification of Maxwell's Law of speed distribution: most probable speed, average and r.m.s. speed, Mean free path.
3.	March 2024	Transport of energy and momentum, diffusion of gases. Brownian motion (qualitative), Real gases, Vander Waal's equation. Theory of Relativity: Reference systems, inertial frames, Galilean invariance and Conservation laws, Newtonian relativity principle.
4	April 2024	Michelson – Morley experiment: Search for ether. Lorentz transformations length contraction, time dilation, velocity addition theorem, variation of mass with velocity and mass energy equivalence. Revision.

**Govt. College for Women Lakhan Majra, Rohtak**  
**Lesson Plan (Even Semester 2023-24)**

**Name of Assistant Professor: Dr. Sunil Dhankhar**

**Class: - B.Sc. 4<sup>th</sup> Semester**

**Subject: Physics**

**Paper I – PHY-401: Statistical Mechanics**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxes. Case with weightage (general). Phase space, microstates and macrostates, statistical fluctuations
2.	February 2024	Constraints and accessible States, Thermodynamical probability. Postulates of Statistical Physics. Division of Phase space into cells, Condition of equilibrium between two systems in thermal contact. $\beta$ -Parameter. Entropy and Probability, Boltzmann's distribution law. Evaluation of A and $\beta$ .
3.	March 2024	Bose-Einstein statistics, Application of B.E. Statistics to Planck's radiation law, B.E. gas. Fermi-Dirac statistics, M.B. Law as limiting case of B.E. Degeneracy and B.E., Condensation.
4.	April 2024	F.D. Gas, electron gas in metals. Zero point energy. Specific heat of metals and its solution. Revision & Test.

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**Name of Assistant Professor: Dr. Sunil Dhankhar**

**Class: - B.Sc. 6<sup>th</sup> Semester**

**Subject: Physics**

**Paper II – PHY-602: Nuclear Physics**

<b>Sr. No.</b>	<b>Date/Week/Month</b>	<b>Syllabus</b>
1.	January 2024	Nuclear mass and binding energy, systematic nuclear binding energy, nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadruple 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.
2.	February 2024	Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Energetic 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 energetic of beta decay.
3.	March 2023	Energy loss of beta- particles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray, Nature of gamma rays, Energetic of gamma rays, passage of Gamma radiations through matter (photoelectric, Compton and pair production effect) electron position annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application
4.	April 2024	Nuclear reactions, Elastic scattering, Inelastic scattng, Nuclear disintegration, photonuclear reaction, Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and reaction threshold. 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. counters detailed study, scintillation counter and semiconductor detector.