

Lesson Plan 2023-24 (Even Semester)
(January 2024 to April 2024)
Sub: Physics (Statistical Mechanics
& Optics-II)
Paper- I (PHY-401) & II (PHY-402)
Class: B.Sc (Semester: IV)

Name: Dr. Neha Aggarwal
Department: Physics

MONTH	TOPICS TO BE COVERED
JANUARY	Statistical Mechanics: Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxes. Case with weightage (general).
FEBRUARY	Phase space, microstates and macrostates, statistical fluctuations constraints and accessible states, Thermodynamic probability. Postulates of statistical Physics, division of phase space into cells. Condition of equilibrium between two systems in thermal contact, b- parameter. Entropy and Probability, Boltzmann's distribution law. Evaluation of A and b. Bose-Einstein statistics, Application of B.E. Statistics to Planck's radiation law, B.E. gas.
MARCH	Fermi-Dirac statistics, M.B. Law as limiting case of B.E. Degeneracy and B. E. Condensation. F.D. Gas, electron gas in metals. Zero-point energy. Specific heat of metals and its solution. Optics-II 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 wavelength. Fresnel's Diffraction: Fresnel's half period zones, zone plate, Diffraction at a straight edge, rectangular slit and circular aperture. Fraunhofer diffraction: One slit diffraction, Two slit diffraction N-slit diffraction, Plane transmission grating spectrum.

<p style="text-align: center;">APRIL</p>	<p>Dispersive power of a grating, Limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating.</p> <p>Polarization: Polarisation and Double Refraction: Polarisation by reflection, Polarisation by scattering, Malus law, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of Polarised light: Nicolprism, 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 Biquartz).</p>
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Lesson Plan 2023-24 (Even Semester)
(January 2024 to April 2024)
Sub: Electro-magnetic Induction and Electronic Devices
Paper- II (PHY-202)
Class: B.Sc (Semester: II)

Name: Dr. Neha Aggarwal
Department: Physics

MONTH	TOPICS TO BE COVERED
JANUARY	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).
FEBRUARY	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.
MARCH	Transistors : Junction Transistors, Bipolar transistors, working of NPN and PNP transistors, Transistor connections (C-B, C-E, C-C mode), constants of transistor. 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 amplifier.
APRIL	Classification of amplifiers. Resistance-capacitance (R-C) coupled amplifier (two stage; concept of band width, no derivation). Feed-back in amplifiers, advantage of negative feedback Emitter follower. Oscillators: 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.