GOVT COLLEGE BHERIAN, SESSION 2023-24
Lesson Plan: (from FEB. 24 to MAY 24)

Name of Assistant/Associate Professor: MS. SWATI
Class and Section: B. SC I Sem.-2 Subject: CC/MCC (Electricity, Magnetism and EM Theory) Course code- B23-PHY-201

Dates	Lesson Plan
WEEK1	**UNIT-1** **Vector Background and Electric Field** : Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem
WEEK-2	Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field E from potential as gradient Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume. Revision unit-1
WEEK-3	**UNIT-2** **Magnetic Field:** Biot-Savart law and its simple applications: straight wire and circular loop, 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
WEEK-4	**Magnetic Properties of Matter:** 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, Relation between B, H and M, Electronic theory of dia and paramagnetism
WEEK -5	Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization- B-H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve Revision unit-2
WEEK-6	HOLI VACATION
WEEK -7	**UNIT-3** **Time varying electromagnetic fields:** Electromagnetic induction, 11 34(578) Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance
WEEK-8	Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance
WEEK- 9	**Electromagnetic Waves:** Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics Revision unit-3
WEEK 10	**UNIT-4**

	DC current Circuits: Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem
WEEK-11	Networks Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem
WEEK-12	Alternating Current Circuits: A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits
WEEK 13	LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit. Revision unit-4
WEEK 14	REVISION
EXAM ONWARDS	

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GOVT. COLLEGE BHERIAN, SESSION 2023-24
Lesson Plan: (from JAN.2024 to MAY.2024)

Name of Lecturer: Ms. Swati
Class and Section: B. SC II (SEM-IV) Subject: PHYSICS- PH-402 (Wave and Optics II)

DATES	LESSON PLAN
WEEK1	**Unit-1: Polarization** Polarization: Polarisation by reflection, refraction and scattering,
WEEK-2	Malus Law, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism,
WEEK-3	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 optical rotation, Specific rotation, Polarimeters (half shade and Biquartz
WEEK-4	Revision Unit I **Unit-II: Fourier analysis** Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions,
WEEK -5	Fourier series of functions f(x) between (i) 0 to 2pi, (ii) –pi to pi, (iii) 0 to pi, (iv) –L to L, complex form of Fourier series,
WEEK-6	Application of Fourier theorem for analysis of complex waves: solution of triangular and rectangular waves, Half and full wave rectifier outputs, Parseval identity for Fourier Series
WEEK -7	Revision Unit II **Unit III: Fourier transforms** Fourier Integrals, Fourier transforms and its properties, Application of Fourier transform (i) for evaluation of integrals
WEEK-8	(ii) for solution of ordinary differential equations, (iii) to the following functions: 1. $f(x)= e^{-x^2/2}$; $\lvert X\rvert<a$ 2. $f(x) =0$; $\lvert X\rvert>a$
WEEK- 9	**Geometrical Optics I**

	Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses, Revision Unit III
WEEK 10	**Unit-IV: Geometrical Optics II** Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies. Practical Lab G2
WEEK 11	**Fiber Optics** Optical fiber, Critical angle of propagation, Mode of Propagation Acceptance angle, Practical
WEEK-12	**HOLI VACATION**
WEEK 13	Fractional refractive index change, Numerical aperture.
WEEK 14	Types of optics fiber, Normalized frequency
WEEK 15	Applications, Pulse dispersion, Attenuation, Fiber optic Communication, Advantages , Revision unit-4
WEEK16	REVISION
EXAM ONWARD	

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GOVT. COLLEGE BHERIAN, SESSION 2023-24
Lesson Plan: (from JAN. 2024 to MAY 2024)

Name of Lecturer: Ms. Swati
Class and Section: B. SC III (VI SEM.) Subject: PHYSICS- PH-602 (ATOMIC AND MOLECULAR SPECTROSCOPY), PHYSICS LAB

DATES	LESSON PLAN
WEEK1	**Unit – I: Historical background of atomic spectroscopy** Introduction of early observations, emission and absorption spectra, Practical Lab G1
WEEK-2	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, Practical Lab G1.
WEEK-3	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, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Practical Lab G1.
WEEK-4	Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, Practical Lab G1.
WEEK -5	Spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules **Unit –II: Vector Atom Model (single valance electron)** Orbital magnetic dipole moment (Bohr magneton), behavior of magnetic dipole in external magnetic filed , Practical Lab G1.
WEEK -6	Larmor's precession and theorem. 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. quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, Practical Lab G1.
WEEK-7	Term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms. observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum, Practical Lab G1.
WEEK- 8	REVISION Unit II **UNIT-III: Vector Atom model (two valance electrons)** Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom : application of spectra, Practical Lab G1.
WEEK 09	Coupling Schemes;LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule, Pauli

	principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), Practical Lab G1.
WEEK10	Equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin, Practical Lab G1.
WEEK 11	**Unit –IV: Atom in External Field** Zeeman Effect (normal and Anomalous), Experimental set-up for studying Zeeman effect Explanation of normal Zeeman effect (classical and quantum mechanical), Practical Lab G1.
WEEK-12	HOLI VACATION
WEEK 13	Explanation of anomalous Zeeman effect(Lande g-factor), 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, Practical Lab G1.
WEEK 14	**Molecular Physics** General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Practical Lab G1.
WEEK 15	Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra, Practical Lab G1.
WEEK 16	REVISION
EXAM ONWARDS	

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GOVT COLLEGE BHERIAN, SESSION 2023-24
Lesson Plan: (from FEB. 24 to MAY 24)

Name of Assistant/Associate Professor: MS. SWATI
Semester: II Course Name: Food Waste And By-Product Utilization, Code: B23-SEC-215

Dates	Lesson Plan
WEEK1	**UNIT-1** Introduction to food waste: Definition and types of food waste; environment, economic, social impacts of food waste
WEEK-2	Environment, economic, social impacts of food waste
WEEK-3	Food waste throughout the supply chains; Factors contributing to Foodwaste ; Post-harvest losses
WEEK-4	storage challenges Retail and consumer-related food waste Food waste in food service establishment and restaurants Revision Unit-1
WEEK -5	**UNIT-2** Food Waste Management and Reduction: Source reduction strategies
WEEK-6	HOLI VACATION
WEEK -7	Food donation and redistribution programs; Composting and anaerobic digestion
WEEK-8	Innovative technologies for food waste reduction Revision of unit-2
WEEK- 9	**UNIT-3** Overview of by-product utilization; Extraction of bioactive compounds from food waste
WEEK 10	Conversion of food waste into biofuels and energy
WEEK-11	Recovery of value-added materials from food waste
WEEK-12	**UNIT-4** Applications of Food Waste By-Products; Food industry applications (e.g., food additives, functional ingredients)
WEEK 13	Animal feed and pet food production, Fertilizer and soil amendment production, Waste-to-packaging concepts
WEEK 14	Policy frameworks and regulations REVISION
EXAM ONWARDS	

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