P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) EVEN SEMESTER

Name of Teacher: Ms. Aashi Mittal
Designation: Assistant Professor
Subject: PHYSICS
Class: B.Sc. (2nd Sem) **Subject/Paper: Electricity, Magnetism and EM theory (B25-PHY-201)**

Sr. No.	Months	Topics to be covered
1	January-February	Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physica significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Causs's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field, Eectrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field i 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.
2	March-April	Magnetic Field: Biot-Savart law and its simple applications straight wire and circular loop, Current Loop as u Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Tcroid, properties of B: curl and divergence Magnetic Properties of Matter: Force on a dipele in an external field, Electric currents in Atoms, Flectron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic intensity (1), Magnetic Susceptibility and permeability, Relation between B, 11 and M. Electronic theory of dia and paramagnetism, Domain heory of ferromagnetism (Langevin's theory), Cyele of Magnetization-3-11 curve and hysteresis loop: Energy dissipation, Ilysteresis loss and importance of Hysteresis Curve **Time varying electromagnetic fields:** Electromagnetic induction, 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
3	April-May	. **Electromagnetic Waves:** Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. DC Curent Circuits: Electric circuit and current density, Electrical Conductivity and ohm's law(Review), Kirchoff law for DC Network Alternating current circuits: Resonace circuit, phasor, complex reactance and impedance, analysis for RC,RL and RLC Circuits,Series LCR circuit(1) Resonace,(2) Power Dissipiation(3) Quality factor (4) Band width, parallel LCR circuit

*Vacation as per university calendar

- Assignment and Midterm test will be taken as per schedule.

Aashi

Maxwell's equations in differential and integral form

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) EVEN SEMESTER

Name of Teacher: Aashi Mittal
Designation: Assistant Professor
Subject: Computational Physics
Class: B. Sc. II sem (Major in Physics)

Subject/Paper: Sr. No.	Months	Topics to be covered
1	Jan-Feb	Interpolation :- Forward and Backward Differences. Symbolic Relation. Differences of a Polynomial. Newton' Forward and Backward Interpolation Formulas. Divided Differences. Newton's General Interpolation Formula.
2	March	Numerical Differentiation and Integration: Forward and Backward difference formula, newton cotes Quadrature formula,Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Gaussian Quadrature, Legendre-Gauss Quadrature
2	April	**Solution of ODE First order Differential equation**: Taylor series method,Euler, modified Euler and Runge- Kutta second order methods Second order differential equation e.g. First order differential equation, Radioactive decay, Current in RC, LC circuits with DC source. **Error and Iterative methods**: Truncation and Round-Off Errors, Floating point computation, overflow and underflow,single and double precision
3	May	**Solution of Algebraic and Transcendental Equations**. Fixed-Point Iteration Method, Bisection Method, Secant Method, Newton-Raphson Method, Comparison and Error Estimation.

Vacation as per university academic calendar

Mid term and assignment as per schedule

Aashi

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) EVEN SEMESTER

Name of Teacher: Dr. Manju Sharma
Subject: Atomic Spectroscopy

Designation: Assistant Professor
Class: B.Sc. Major(Physics) (4th Sem)

Months	Units/Topics to be covered	Remarks if any,
January-February	**Unit-1** : Introduction of early observations, emission and absorption spectra, 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 H-atom, 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, shortcomings of Bohr's theory. Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules.	Videos of the related topics will be shown on smart board. Class Test/Quiz shall be conducted after the completion of the unit.
March	**Unit-2:** Orbital magnetic dipole moment (Bohr magneton), behavior of magnetic dipole in external magnetic field; 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, term series and limits, Rydberg-Ritz 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 H- spectrum.	be shown on
April	**Unit-3:** Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. 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 principle and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), 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.	

May	**Unit-4:** Zeeman Effect (normal and Anomalous), Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), 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 H- atom.	

*Vacation as per university calendar

- Assignment and unit test will be taken as per schedule.

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
LESSON-PLAN (Session 2025-26) EVEN SEMESTER

Name of Teacher: Dr. Manju Sharma
Subject: Electronics

Designation: Assistant Professor
Class: B.Sc. Final (6th Sem)

Months	Units/Topics to be covered
January-February	**Unit-1** : Semi-Conductor Diodes: Semiconductors: Intrinsic and Extrinsic, p-n Junction diode and its V-I characteristics, Ideal Diode, Zener and Avalanche Breakdown, Zener Diode and its application as Voltage regulator, Photo-Diode, Light Emitting Diode, Solar Cell
March	**Unit-2:** The Bipolar Transistor: The Bipolar Junction Transistor, Transistor Action and Working (PNP and NPN transistor), Transistor Circuit configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configurations, Current Amplification Factors α, β and γ) and Relationship between them.
April	**Unit-3:** Amplifiers: CB, CC and CE amplifiers, Transistor Biasing: selection of operating point, Load line analysis and operating point. Multistage Transistor amplifiers: RC Coupled amplifier (two-stage, concept of bandwidth, no derivation), Classification of amplifiers: Class A, B, AB and C amplifiers.
May	**Unit-4:** Oscillators: Types of feedback, Oscillators, Damped and Undamped Oscillations, Oscillatory circuit, Principle of Oscillation, Condition for self-sustained oscillation: Barkhausen Criteria for sustained oscillations, LC oscillators: Tuned collector, Tuned Base, Hartley Oscillator, Colpitt's Oscillator.

*Vacation as per university calendar

- Assignment and Mid-Term test will be taken as per schedule.

Lesson Plan

Name of the Course: Waves and Optics,BSc 4th Sem

Name of the Teacher: Dr. Ramesh Kumar, Assistant Professor of Physics

Feb	INTERFERENCE Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference, Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet, phase change on reflection. Interference by Division of Amplitude: Plane parallel thin film, production of colors in thin films, classification of fringes in thin films, Interference due to transmitted light and reflected light, wedge shaped film, Newton's rings.
March-April	DIFFRACTION Fresnel Diffraction: Half-period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis. Fraunhoffer diffraction: Single slit diffraction, double slit diffraction, plane transmission grating spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and grating. POLARIZATION Polarization: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction, Huygens's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. 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. Qualitative idea of optical rotation and Polarimeters
April-May	Lasers: Basic concept of absorption and emission of radiations, amplification and population inversion; Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator; Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (Spatial & Temporal coherence); Metastable state, Excitation mechanism and Types of Lasers (He-Ne Laser & Ruby Laser), Applications of Lasers

Lesson Pan

Name of the Course: Exploring the Journey of Indian Space Satellites UG 4th Sem

Name of the Teacher: Dr. Ramesh Kumar, Assistant Professor of Physics

Feb	Concept of Satellite, ideas and theories, Concept of Orbits, The transfer orbit, hurdles in launching a satellite, space scarcity in space. Indian pace program, Objectives of the Indian Space Program, Organizational set-up.
March-April	Communication Satellite: Orbit and Description: A brief History of Satellite Communication, Satellite Frequency bands, Satellite Systems, Applications, Orbital Period and Velocity, Effects of Orbital inclination, Azimuth and Elevation, Coverage and Slant range, Eclipse, Orbital perturbations, Placement of a Satellite in a Geo-Stationary Orbit
April-May	Space Centres and institutes, Genesis of Indian's space program, Indian Satellites, Indian Communications satellites and their applications. Classification of Satellites based on Orbit Height. Indian remote sensing satellites, Indian National Satellites Launch vehicle technology, Milestones in India's Space Programme.

Lesson Plan

Name of the Teacher: Dr. Ramesh Kumar, Assistant Professor of Physics

Name of the Course: Physics in Everyday Life, BSc 4th Sem

Feb	MECHANICS Every day activities related to Force, weight, work, energy, power and centrifuge; washing machine.
March-April	HEAT Variation of boiling point with pressure, pressure cooker, cooling by expansion, refrigerator, air conditioner, Bernoulli principle – Bunsen burner, aeroplane SOUND AND OPTICS Sound waves, Doppler Effect, power of lens, long sight and short sight, microscope, telescope, binocular camera, video camera.
April-May	ELECTRICAL AND ELECTRONIC APPLIANCES Working of the tube light and fan, kilowatt hour, fuse and heating elements, microwave oven, electric heater, photoelectric effect.

P.I.G. GOVT. COLLEGE FOR WOMAN, JIND

LESSON PLAN – 2025-26

NAME OF TEACHER- ANKITA

DESIGNATION- EXT. LECTURER

SUBJECT- PHYSICS

CLASS- MAJOR PHYSICS B.Sc. IInd Year

MONTH	TOPIC TO BE COVERED	REMARKS
FEBRUARY	THE ORIGIN QUANTUM PHYSICS – I Inadequacies in Classical Physics, Overview of quantum physics, boundary between classical and quantum phenomena, Blackbody Radiation, Planck's Quantum Theory, Photons, Photoelectric effect, Compton effect (theory and result), Bohr model of atom. Frank-Hertz experiment, de- Broglie hypothesis, Davisson and Germer experiment. Problem with de Broglie hypothesis.	
MARCH	THE ORIGIN QUANTUM PHYSICS – I Concept of wave packet, phase velocity, group velocity and their relation. Heisenberg's uncertainty principle. Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Waveparti duality), Uncertainty principle from the Gamma Ray Microscope. Uncertainty principle from electron diffraction due to single slit.	
APRIL	THE SCHRODINGER WAVE EQUATION – Time dependent and time independent Schrodinger equation, dynamical evolution of a quantum state; properties of Wave Function, Interpretation of Wave Function, Condition for physical acceptability of Wave Functions. Eigenvalues and Eigen functions, Mathematical consideration of Schrodinger equation: Normalization, Orthogonality, Observables, Stationary states, Position, Linear momentum & Energy operators; commutator of position and linear momentum operators; Probability current density, Expectation values position and linear momentum	
MAY	APPLICATION OF SCHRODINGER WAVE EQUATION (i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eig values, quantization of energy and momentum, nodes and anti-nodes, zero point energy). (ii) One dimensional step potential E > Vo (Reflection and Transmission coefficient) (iii) One dimensional step potential E < Vo (penetration depth calculation). (iv) One dimensional potential barrier, E > Vo (Reflection and Transmission coefficient) (v) One-dimensional potential barri E < Vo (penetration or tunneling coefficient) (VI) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, Zero-point energy, wave equation for ground state and excited states).	

Ankita

dimensional box (solution of Schrodinger wave equation, eigen functions, eig

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND

Lesson plan session 2025-26

Name of teacher- **Ankita**

Designation- **Ext. Lecturer**

Subject – **Physics**

Class – **MDC- 2**

Month	Topic to be covered	Remarks
February	**Unit -1** **Light and optics**-Nature and properties of light, its speed, frequency and wavelength; Reflection of light- types of reflection and their importance in daily life, laws of reflection. **Refraction of light-** laws of refraction, refractive index, refraction of light through prism (dispersion of light), formation Rainbow, twinkling of stars, advance Sunrise and delayed Sunset; Scattering of light and blue colour of the sky; apparent depth, total internal reflection.	
March	**Unit -2** **Image formation through reflection-**images formed by plane mirrors, multiple images formed by two flat mirrors and optical illusions; images formed by parabolic mirrors and spherical mirrors- Concave and convex mirrors, ray diagrams, mirror equation and magnification; applications of plane and curved mirrors in daily life. **Image formation through refraction-** images by convex and concave lenses, ray diagrams and lens equation.	
April	**Unit -3** **Electricity**- electric charge, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, units of electric current, measurement of current, conductors and insulators; resistance, resistivity and Ohm's law, electric potential and potential difference, emf; **Electric circuit-** resistor, capacitor, battery, ammeter and voltmeter; Series and parallel combinations of resistors, electrical wiring in houses andelectrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission current and its practical applications. **Magnetic effect of electric current-** Magnetic field and field lines, bar magnet, magnetic field and direction of field due to a current- through straight conductor.	
May	**Unit -4** **Structure of an atom-** Rutherford's model of an atom, Bohr's model of an atom and composition of the atom- electron, proton and neutron, orbits or shells (energy levels in an atom), distribution of electrons in different shellsof the atom, atomic number and atomic mass of an atom, valency of an atom, excitation and ionization of the atom, meaning of atomic transitions; Discovery of X-rays, Generation of X-rays, Composition of nucleus, meaning of nuclear transitions. **Note - assignment and Mid-term exam will be taken as per schedule**	

Ankita

P.I.G. GOVT. COLLEGE FOR WOMEN, JIND
Lesson plan session 2025-26

Name of Teacher: Ankita
Designation: Ext. Lecturer
Subject: Physics
Class: VOC

Months	Topics to be covered	Remarks if any,
February	**UNIT - 1** **Introduction to solar energy and solar panels**: Solar Energy and its potential, Harnessing solar energy, need for Solar energy to electrical energy conversion, Solar photo voltaic (SPV) system, SPV panels and their types ratings and specifications. Advantages and disadvantages of SPV panels, basics of load calculation and SPV requirement	
March	**UNIT - 2** **SPV Panels systems**: Solar panel to SPV systems: OFF grid and ON grid solar systems, Areas of applications of SPV systems, components of solar systems; solar panel, inverter (Stand alone and grid tied), Battery Energy system (BES), Charge controller,Tools and equipments: Digital MultiMate Clamp Meter Hydrometer, Sun pathfinder Thermography Camera, drills and fasteners, sealents, pliers and strippers, Pyranometer, Personal Protective Equipments (PPE), Battery maintenance kit Battery water filler etc.	
April	**UNIT - 3** **Installation of SPV Panels**: Site selection criteria, steps and procedure for solar panel array installation, different mounting structures, installation of AC and DC distribution boxes, earthing and grounding pits, optimal cable sizing and cable laying. **Testing and Inspection**: Testing methods and techniques, testing of SPV open circuit and load voltage, Battery SOC testing, testing of protective systems and earth resistance, Inspection of connected systems and running a test.	
May	**UNIT - 4** **Maintenance and Troubleshooting**: Scheduled and unscheduled maintenance, checking dust accumulation, Module Shading Module Mismatch, Physical Integrity, standard trouble shooting procedure. **Note- assignment and Mid-term exam will be taken as per schedule.**	

Ankita

Name - Priyanka

Department- Physics

Session- 2025-26

Paper - Laser physics and fiber optics

February

Unit 1- The Einstein Coefficients, Absorption and Emission cross-sections; Light amplification by an atomic system; Threshold condition; Origin of Line Shape function: Lorentzian and Gaussian shape functions; Line Broadening mechanisms – Homogeneous broadening: Natural Broadening, Collision broadening; Inhomogeneous broadening: Doppler Broadening.

March

Unit 2- Two Level laser system, Three Level laser system, Four Level Laser Systems (Threshold population, threshold pump rate, Laser power output with suitable examples), Variation of laser power around threshold; Optimum output coupling. Cavity modes: Number of modes in 1D, 2D and 3D cavities.Unit 3 - Introduction; step index fibre, numerical aperture, pulse dispersion in step index fibre, graded index, material dispersion. Comparison of step and graded index fibres. Propagation of light in optical fibres: Basic structure and optical path of an optical fibre, Modes of propagation

April

meridional and skew rays, number of modes and cut off parameters of fibres, Single mode propagation. Disadvantage of monomode and graded index multimode fibre.Unit 4 - Glass fibre, plastic fibre, losses of fibres; bending losses, intrinsic fibre losses, scattering losses and absorption losses. Fibre Cables: Fibre cable construction, Strength member, cable tensile loading, Minimum bend radius

May

Losses incurred during installation of cables or during subscriber service, testing of cables, cable selection criteria. Outside vapour phase oxidation, vapour phase axial deposition, modified chemical vapour deposition.

Revision of all syllabus

Note -

Assignment and 1 mid term exam will be taken as per sechdule.

Name: Priyanka

Department- Physics

Session- 2025 -26

Class - BSC 1st (minor PHYSICS)

Paper - Elementary electricity, magnetism and EM theory

Feburary

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.

MARCH

Magnetic induction, Magnetic flux, Solenoidal nature of vector field of induction, properties of B (i) $\nabla \cdot B = 0$ (ii) $\nabla \times B = \mu_0 J$, Magnetic Materials, types, Hysteresis curve and importance of Hysteresis Curve.

APRIL

Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Derivation of Maxwell's equations and their physical significance. Boundary conditions at interface between two different media, Propagation of electromagnetic wave (Basic idea, no derivation), Poynting vector and Poynting theorem.

MAY:

Electric currents and current density; Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks.

Revision of all syllabus.

Note :

Assignment and mid term exam will be taken as per sechdule.

Name - Priyanka

Department- Physics

Session- 2025 -26

Paper - Exploring the Journey of Indian Space Satellites

February

Concept of Satellite, ideas and theories, Concept of Orbits, The transfer orbit, hurdles in launching a satellite, space scarcity in space. Indian space program, Objectives of the Indian Space Program, Organizational set-up.

March

Communication Satellite: Orbit and Description; A brief History of Satellite Communication, Satellite Frequency bands, Satellite Systems, Applications, Orbital Period and Velocity, Effects of Orbital inclination, Azimuth and Elevation, Coverage and Slant range, Eclipse, Orbital perturbations, Placement of a Satellite in a Geo-Stationary Orbit.

April

Space Centres and institutes, Genesis of India's space program, Indian Satellites, Indian Communications satellites and their applications. Classification of Satellites based on Orbit Height. Indian remote sensing satellites, Indian National Satellites.

May

Launch vehicle technology, Milestones in India's Space Programme.

Revision of all syllabus.

Note :

Assignment and 1 unit test will be taken as per sechdule.