

# GOVT COLLEGE SAFIDON      SESSION 2024-25

B.Sc. 4th Sem Physics

LESSON PLAN

Paper Waves and Optics

Teacher: Ajay Parkash

MONTH	TOPICS
January	<b>Interference by Division of Wave front:</b> Young's Double Slit experiment, Coherence, Conditions of interference,
	Fresnel's biprism and its application to determine the wavelength of sodium light and thickness of a mica sheet, phase change on reflection.
February	<b>Interference by Division of Amplitude:</b> 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.
	<b>DIFFRACTION :</b> Fresnel Diffraction: Half period zones, Zone plate, Fresnel Diffraction pattern of a straight edge, a slit and a wire using half period zone analysis.
	Fraunhofer diffraction: Single slit diffraction, double slit diffraction, phase transmission grating spectrum,
March	Dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and grating.
	<b>POLARISATION :</b> Polarisation by reflection, refraction and scattering, Malus law, Phenomenon of double refraction,
	Huygen'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
April	Qualitative idea of optical rotation and Polarimeters.
	<b>LASERS:</b> Basic concepts of absorption and emission of radiations, amplification and population inversion;
	Main Components of laser (i) Active Medium (ii) pumping (iii) optical resonator.
	Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (spatial and Temporal coherence)
May	Metastable State, Excitation mechanism and Types of Lasers (He-Ne Laser & Ruby Laser),
	Applications of Lasers. DOUBT, TEST,

# GOVT COLLEGE SAFIDON      SESSION 2024-25

B.Sc. 6th Sem Physics

LESSON PLAN

Paper Atomic and Molecular Spectroscopy

Teacher: Ajay Parkash

MONTH	TOPICS
January	<b>Historical Background of Atomic Spectroscopy:</b> Introduction of early observation , emission and absorption spectra, atomic spectra, wave number, spectrum of hydrogen atom in Balmer Series, Bohr's atomic model (Bohr's postulates), Spectra of Hydrogen atom, explanation of spectral series in hydrogen 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, short-comings of Bohr's theory,
February	<b>Wilson Sommerfield</b> quantization rule, de-Broglie interpretation of Bohr's quantization law, Bohr's Correspondence principle, Sommerfield's extension of Bohr's model, Sommeffield's relativistic correction
	Shortcomings of Bohr's Sommerfield theory, Vector atom model, space quantization, electron spin, coupling of spin and orbital angular momentum, spectroscopy terms and their notations, quantum numbers associated with vector atom model, transition probability and selection rules.
	<b>Unit-II</b> Orbital magnetic dipole moment (Bohr magneton), Behaviour 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 valence electrons, spin orbit interaction for penetrating and non-penetrating orbits
March	Quantum mechanical relativity correction, Hydrogen fine spectra, Main features of alkali spectra and their theoretical interpretations, 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 hydrogen spectrum. .
	<b>UNIT-III</b> Essential features of spectra of alkaline-earth elements, Vectors model for two valence electron atom: Application of spectra, Coupling Schemes : LS or Russell Saunders Coupling Scheme and JJ coupling Scheme,
	Interaction energy of LS Coupling( sp, pd configuration) , Lande interval rule, Pauli principal and periodic classification of the elements. Interaction energy in JJ coupling ( sp, pd configuration), Equivalent and non-equivalent electrons,
	Two valence electron system spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in LS and JJ Coupling, Hyperfine structure of spectral lines and its origin: Isotope effect, Nuclear spin.
April	<b>UNIT-IV: Atom in External Field:</b> Zeeman effect ( normal and anomalous), Experimental set-up for studying Zeeman effect.
	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.
	<b>Molecular Spectroscopy:</b> General considerations, Electronic states of diatomic molecules
May	Rotational spectra ( Far IR and Microwave Region), Vibration spectra (IR region)
	Rotator model of diatomic molecule, Raman effect, Electronic spectra, DOUBT, TEST,



# GOVT COLLEGE SAFIDON      SESSION 2024-25

PG Classes

LESSON PLAN

Paper   Constitutional, Human and Moral Values and IPR   Teacher: Ajay Parkash

MONTH	TOPICS
January	<b>Constitutional Value:</b> Historical perspective of Indian Constitution;
	Basic Values enshrined in the Preamble of the Indian Constitution;
February	Concept of Constitutional Morality, Patriotic values and ingredients,
	National Building, Fundamental rights and Duties,
	Directive Principles of the State Policy,
	Humanistic Value: Humanism, Human virtues and Civic Sense,
March	Social Responsibilities of Human beings, Ethical ways to deal with human aspirations;
	Harmony with society and nature,
	Idea of international peace and Brotherhood ( Vasudhaiv Kutumbkam)
	Moral Values and Professional Conduct: Understanding morality and moral values;
April	Moral Education and character building, Ethics of relations:Personal, social, and professional;
	Introduction to Gender Sensitization, Affirmative approach towards Weaker Sections ( SCs, STs, OBCs, EWS & DAs)
	Ethical Conduct in Higher Education Institutions; Professional Ethics.
	Intellectual Property Rights:
	Meaning, Origins and nature of intellectual Property Rights (IPRS)
May	Different Kinds of IRs Copyright, Patent, Trademark, Trade Secrets/Dress, Design, Traditional Knowledge,
	Infringement and offences of IPRS, Remedies and Penalties, Basics of Plagiarism policy of UGC, DOUBT, TEST