DR. BHIM RAO AMBEDKAR GOVT. COLLEGE JAGDISHPURA (KAITHAL)

Lesson Plan: (from 08 Jan, 2024 to 30 April, 2024)

Name of Assistant Professor: **Dr. Devender Kumar**
Class and Section: **B. Sc VIth Sem (Non-Medical and Computer Science)**
Subject: **PHYSICS** Paper Code: **PH-601**
Name of Paper: **Atomic & Molecular Physics**

DATES	LESSON PLAN
WEEK2 (Jan 2024)	**Unit-1: Historical Background of Atomic Spectroscopy** 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)
WEEK-3 (Jan 2024)	Spectra of hydrogen atom, explanation of spectral series in hydrogen atom, Un-quantized states and continuous spectra (correction of finite nuclear mass), Variation in Rydberg constant due to finite mass
WEEK-4 (Feb 2024)	Shortcomings of Bohr's theory, Wilson Sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr correspondence principle, Shortcomings of Bohr-Sommerfeld theory
WEEK5- (Feb 2024)	Vector atom model, space quantization, Electron spin, coupling of orbital and spin angular momentum, Spectroscopic terms and their notations, quantum numbers associated with vector atom model, Transition probability and selection rules
WEEK -6 (Feb 2024)	**Unit-II: Vector atom Model (single Valence Electron)** Orbital magnetic dipole moment (Bohr magneton), behavior of magnetic dipole in external magnetic field, Larmor's precession and theorem
WEEK-7 (Feb 2024)	**Assignment 1 and Internal Examination Test** penetrating orbits on the classical model, quantum defect, spin orbit interaction energy of single valence electron,
WEEK -8 (March 2024)	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
WEEK-9 (March 2024)	Rydberg-Ritz combination principle, absorption spectra of alkali atoms, observed fine structure in the spectra of alkali metals and its interpretation, intensity rules for doublets and comparison of alkali spectra and hydrogen spectrum
WEEK- 10 (March 2024)	**Unit-III: Vector atom Model (Two Valence Electrons)** Essential features of spectra of alkaline-earth elements, vector model for two valence electron atom, application of spectra, Coupling schemes: LS or Russel-Saunder coupling scheme and JJ coupling scheme
WEEK-11 (March 2024)	Interaction energy in L-S coupling scheme (sp, pd configuration), Lande interval rule, Pauli principle and periodic classification of elements, interaction energy in JJ coupling (sp, pd configuration)
WEEK-12 (April 2024)	Equivalent and non-equivalent electrons, two valence electrons system- spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms of

	L-S and J-J coupling, hyperfine structure of spectra of lines and its origin, isotopic effect, nuclear spin.
WEEK-13 (April 2024)	**Unit-IV: Atoms in External Field & Molecular Physics** 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 single valence electron system, weak field Stark effect of hydrogen atom
WEEK -14 (April 2024)	**Assignment-2** General considerations, electronic states of diatomic molecules, rotational spectra (far infrared and microwave region), vibrational spectra (IR region) rotator model of diatomic molecules, Raman effect, electronic spectra
WEEK-15(April 2024)	**Class Tests and Revision**
1 MAY 2024 EXAM ONWARDS	

Signature
Department of Physics, G.C. Kaithal