

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

Lesson Plan: odd Semester (from 22 JULY, 2024 to 22 NOVEMBER, 2024)

Name of Assistant Professor: **Dr. Devender Kumar**

Class and Section: **BSc Non-Medical Vth Semester**

Subject: **Physics (PH-501 QUANTUM MECHANICS AND LASER PHYSICS)**

Dates	Lesson Plan
JULY : WEEK -4	INTRODUCTION TO THE COURSE.
WEEK-5	Unit I: Origin quantum physics (Experimental basis) Overview, scale of quantum physics, boundary between classical and quantum phenomena, Photon, Photoelectric effect, Compton effect (theory and result).
AUGUST WEEK-1	Frank- Hertz experiment, de-Broglie hypothesis. Davisson and Germer experiment, ·G.P. Thomson experiment. Phase velocity,group velocity and their relation.
WEEK-2	Heisenberg's uncertainty principle. Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope,Electron diffraction from a slit.
WEEK-3	Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle). Time-independent Schrodingerwave equation.
WEEK-4	Eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, concept of observer and operator. Expectation values of dynamical quantities, probability current density
SEPTEMBER WEEK -1	Unit II: Application of Schrodinger wave equation: Free particle in one-dimensional box (solution of Schrodingerwave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and antinodes, zero point energy).
WEEK-2	(i) One dimensional step potential $E > V_0$ (Reflection and Transmission coefficient) (ii) One dimensional step potential $E < V_0$ (penetration depth Calculation). (iii) One dimensional potential barrier, $E > V_0$ (Reflection and Transmission coefficient)
WEEK- 3	(iv) One-dimensional potential barrier, $E < V_0$ (penetration or Tunneling coefficient). Solution of Schrodinger equation for harmonic oscillator(quantization of energy, Zero-point energy, wave equation for ground state and excited states).
WEEK- 4	
OCTOBER : WEEK 1	Unit III: Laser Physics –I Absorption and emission of radiation, Main features of a laser: Directionality, High Intensity, High degree of coherence, spatial andtemporal coherence
WEEK-2	Einstein's coefficients and possibility of amplification, momentum Transfer, life time of a level, kinetics of optical absorption (two and three level rate equation, Fuchbauer landerburg formula).
WEEK-3	Population Inversion :A necessary condition for light amplification, resonancecavity, laser pumping, Threshold condition for laser emission,
WEEK-4	Unit IV: Laser Physics-II He-Ne laser and RUBY laser (Principle, Construction and working)
WEEK-5	Diwali Vacations (27 OCTOBER- 03 NOVEMBER)

NOVEMBER : WEEK-1	Line broadening mechanism, homogeneous and inhomogeneous linebroadening (natural, collision and Doppler broadening).
WEEK-2	Optical properties of semiconductor laser (Principle, Construction and Working),
WEEK-3	Application of laser in the field of medicine and industry.
23 NOVEMBER 2024	EXAM ONWARD



Dr. Devender Kumar
Assistant Professor in Physics

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

Lesson Plan: (from 22 JULY, 2024 to 22 NOVEMBER, 2024)

Name of Assistant Professor: **Dr. Devender Kumar**

Class and Section: **BSc in Physical Sciences with Chemistry Major IIIrd Semester**

Subject: **Physics**

Name of the Course: Basic Instrumentation Skills

Course Code: B23-SEC-329

Dates	Lesson Plan
JULY : WEEK -4	INTRODUCTION TO THE COURSE.
WEEK-5	UNIT I: Basic of Measurements: Instruments accuracy, precision, sensitivity, resolution range, etc. Errors in measurements and loading effects.
AUGUST WEEK-1	Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance.
WEEK-2	Specifications of a multimeter and their significance. Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity.
WEEK-3	Principle of voltage measurement (block diagram only). Specifications of an electronic Voltmeter and their significance.
WEEK-4	AC millivoltmeter: Types of AC millivoltmeters. Block diagram of ac millivoltmeter, specifications and their significance
SEPTEMBER WEEK -1	Unit-II: Oscilloscope: Block diagram of basic CRO. CRT, electrostatic focusing and acceleration (Explanation only no mathematical treatment)
WEEK-2	Brief discussion on screen phosphor, visual persistence. Time base operation, synchronization. Front panel controls. Specifications of CRO and their significance.
WEEK- 3	Use of CRO: for the measurement of voltage (dc and ac) and frequency and time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: principle of working
WEEK- 4	Unit-III: Signal and pulse Generators: Block diagram, explanation and specifications of low frequency signal generator and pulse generator. Brief idea for testing, specifications.
OCTOBER : WEEK 1	Distortion factor meter, wave analysis. Impedance Bridges: Block diagram of bridge. Working principles of basic (balancing type) RLC bridge.
WEEK-2	Specifications of RLC bridge. Block diagram and working principles of a Q- Meter. Digital LCR bridges.
WEEK-3	Unit-IV: Digital Instruments: Comparison of analog & digital instruments. Characteristics of a digital meter. Working principle of digital voltmeter.
WEEK-4	Digital Multimeter: Block diagram and working of a digital multimeter.
WEEK-5	Diwali Vacations (27 OCTOBER- 03 NOVEMBER)
NOVEMBER : WEEK-1	Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.
WEEK-2	REVISION
WEEK-3	REVISION & Class Tests
23 NOVEMBER 2024	EXAM ONWARD



Dr. Devender Kumar
Assistant Professor in Physics