Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2025-26

Class: B.Sc. 2nd Year (Physical Science) **Semester**: 3rd Semester

Name of the Course-Optics

Month	Topic
July	Unit I 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. **Presentation Revision and Test**
August	Unit I Interference by Division of Amplitude: Plane parallel thin film, production of colours in thin films, classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film, Newton's rings Unit-II DIFFRACTION Fresnel's diffraction: Huygens-Fresnel's theory, Fresnel's assumptions, rectilinear propagation of light, diffraction at a straight edge, rectangular slit and diffraction at a circular aperture. **Presentation Revision and Test**
September	Unit II 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 a grating. Unit III 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 (iii) Elliptically polarized light **Presentation Revision and Test**
October	Unit III Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz) Unit–IV 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. **Presentation Revision and Test**
November	Unit-IV FIBRE OPTICS: Optical fibres and their properties, Principal of light propagation through a optical fibre, Acceptance angle and numerical aperture, Types of optical fibres: Single mode and multimode fibres, Advantages and Disadvantages of optical fibres. **Presentation Revision and Test**

Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2025-26

Class: B.Sc. 3rd Year **Semester**-V Semester

Paper I- PHY 501: **SOLID STATE PHYSICS**

Month	Topic
July	Unit I Crystalline and gallssy forms, liquid crystals. **Presentation Revision**
August	Unit I Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Unit cell and primitive cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais tattices in two and three dimensions. **Presentation Revision and Test**
September	Unit-II Crystal planes and Miller indices, Interplanner spacing, Crystal structures of Zinc sulphide, Sodium Chloride and diamond, X-ray diffraction. **Presentation Revision and Test**
October	Unit-II Bragg's Law and experimental x-ray diffraction methods, K-space. Unit-III Reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c. **Presentation Revision and Test**
November	Unit-III Specific heat: Specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids. **Presentation Revision and Test**

Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2025-26

Name of Program: M.Sc. Physics **Semester**-1st

Name of the Course : Physics of Electronic Devices

Month	Topic
August	Unit 1: Charge carriers in semiconductors: Energy bands, metals, Semiconductors and insulators, Direct and indirect band gap semiconductors, Variation of energy bands with alloy composition, Electrons and holes, effective mass, Intrinsic and extrinsic semiconductors, Concept of Fermi level, Electron and hole concentration at equilibrium, Temperature dependence of carrier concentrations, Compensation and space charge neutrality, Conductivity and mobility, Effect of temperature and doping on mobility, Hall effect, Invariance of Fermi level. **Presentation Revision and Test**
September	Unit 2: Carrier transport in semiconductors: Optical absorption and luminescence, Carrier lifetime and photoconductivity, Direct/indirect recombination of electrons and holes, Traps and defects, Steady state carrier generation, Quasi Fermi levels, Diffusion and drift of carriers, Diffusion and recombination, Diffusion length, Haynes Shockley experiment, Gradient in quasi-Fermi level, External and internal photoelectric effect **Presentation Revision and Test**
October	Unit 3: Diode physics and optoelectronic devices: P-N junction diode: Basic structure, Energy band diagram, Built-in potential, Electric field, Space charge width and qualitative description of current flow, Derivation of diode current equation, Zener diode: breakdown mechanisms, Voltage regulator circuit, Power diode, Varactor diode, Optoelectronic devices: Vacuum photodiode, Photo-multipliers tube, P-N junction photodiode, Pin photodiode, Avalanche photodiode, Phototransistor, Solar cell, Light emitting diode (LED), Diode laser: Condition for laser action and optical gain **Presentation Revision and Test**
November	Unit 4: Transistors: Bipolar junction transistor (BJT),Transistor operating modes, Transistor action, Transistor biasing configurations and characteristics, Field effect transistors: Junction field effect transistor (JFET), Metal oxide semiconductor field effect transistor (MOSFET), Negative resistance devices: Tunnel diode, Backward diode, Uni-junction transistor, p-n-p-n devices and their characteristics, Silicon controlled rectifier and switch and their characteristics. **Presentation Revision and Test**