**Lesson Plan of July to November**

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2024-25

**Class**: B.Sc. 2nd Year **Semester**: 3rd

**Paper-II PHY 302 Optics– I**

|  |  |
| --- | --- |
| Month | Topic |
| July | Unit I  Fourier Analysis and Fourier Transforms: Speed of transverse waves on a uniform string.  **Presentation Revision** |
| August | Unit I  Speed of longitudinal waves in a fluid, superposition of waves (physical idea), Fourier Analysis of complex waves and its application for the solution of triangular and rectangular waves, half and full wave rectifier out puts.  **Presentation Revision and Test** |
| September | Unit I  Fourier transforms and its properties. Application of fourier transform to following function.  (I) f(x) = e-x2/2  (II) f(x) = I [x] <a  0 [x] >a  Unit-II  Geometrical Optics : Matrix methods in paraxial optics effects of translation and refraction, derivation of thin lens and thick lens formula.  **Presentation Revision and Test** |
| October | Unit-II  Unit plane, nodal planes, system of thin lenses, Chromatic, spherical coma, astigmatism and distortion aberrations and their remedies.  Physical Optics  Unit III  Interference : Interference by Division of Wavefront  **Presentation Revision and Test** |
| November | Unit III  Fresnel’s Biprism and its applications to determination of wave length of sodium light andthickness of a mica sheet, Lioyd’s mirror, phase change on reflection.  **Presentation Revision and Test** |

**Lesson Plan of July to November**

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2024-25

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

**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 Chlorideand 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 ofsolids.  **Presentation Revision and Test** |

**Lesson Plan of July to November**

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2024-25

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

**Name of the Course** : Physics of Electronic Devices **Course Code**:24PHY201DS04

|  |  |
| --- | --- |
| 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 andoptical 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** |

**Lesson Plan of July to November**

Name of the Assistant/ Associate Professor: Ms. Divya

Session – 2024-25

**Class**: B.Sc. Physical Science **Semester**-1st

**Skill Enhancement Course**

**Electrical Circuit & Instrumentation Skills (24PHY401SE01)**

|  |  |
| --- | --- |
| Month | Topics Covered |
| July | Unit 2: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment).  **Presentations, Revision and Tests** |
| August | Brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes.  **Presentations, Revision and Tests** |
| September | Digital storage Oscilloscope: Block diagram and principle of working  Unit4: Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt.  **Presentations, Revision and Tests** |
| October | Response of inductors and capacitors with DC or AC sources Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Single-phase, three-phase & DC motors.  **Presentations, Revision and Tests** |
| November | Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.  **Revision and Tests** |