**Lesson Plan**

Name of the Faculty : Dr. Monika Panwar

Discipline : Applied Science

Semester : 2nd Semester

Subject : Applied Physics - II

Lesson Plan Duration : 15 weeks

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| Week | Theory | Practical |
| Lecture | Topic | Practical | Topic |
| 1 | 1 | Crystal Structure: lattice translation vector, | 1 | To study the V-I characteristics of a p-n diode. |
| 2 | Crystalline and Amorphous solids, symmetry operations, space lattice, basis |  |  |
| 3 | Unit cell and Primitive cell, Fundamental types of lattices: two-dimensional and three dimensional Bravais lattices |  |  |
| 2 | 4 | Characteristics of Unit cells: Simple Cubic (SC), | 2 | To find the ionisation potential of Argon/Mercury using a thyratron tube. |
| 5 | Body Centred Cubic (BCC), Face Centred Cubic (FCC), Hexagonal Close Packed (HCP) structure; |  |  |
| 6 | Simple crystal structures: Sodium Chloride, Cesium Chloride, |  |  |
| 3 | 7 | Diamond, Cubic Zinc Sulfide; | 3 | To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee’s apparatus. |
| 8 | Miller Indices, Bonding in Solids, |  |  |
| 9 | Point defects in crystals: Schottky and Frenkel defects. |  |  |
| 4 | 10 | Quantum Theory: Need and origin of Quantum concept, | 4 | To study the characteristics of (Cu-Fe, Cu-Constantan) thermocouple. |
| 11 | Wave-particle duality, |  |  |
| 12 | Phase velocity |  |  |
| 5 | 13 | Group velocity, | 5 | To find the value of coefficient of self inductance by using a Rayleigh bridge. |
| 14 | Uncertainty Principle and Applications; |  |  |
| 15 | Applications of Uncertainty Principle |  |  |
| 6 | 16 | Schrodinger’s wave equation: time dependent | 6 | To find the flashing and quenching potential of Argon and to find the capacitance of unknown capacitor. |
| 17 | Schrodinger’s wave equation: time independent |  |  |
| 18 | Physical Significance of wave function. |  |  |
| 7 | 19 | Free Electron Theory: Classical free electron theory: | 7 | To verify Richerdson thermionic equation. |
| 20 | Electrical conductivity in metals, |  |  |
| 21 | Thermal conductivity in metals, Wiedemann-Franz law, |  |  |
| 8 | 22 | Success and drawbacks of free electron theory; | 8 | To find the frequency of ultrasonic waves by piezoelectric methods. |
| 23 | Quantum free electron theory: wave function, eigen values; |  |  |
| 24 | Fermi-Dirac distribution function, Density of states, Fermi energy and its importance, |  |  |
| 9 | 25 | ThermionicEmission (qualitative).and theory of Solids: Bloch theorem, | 9 | To find the value of Planck’s constant by using photoelectric cell. |
| 26 | Kronig-Penney Model (qualitative), |  |  |
| 27 | E versus k diagram, Brillouin Zones, |  |  |
| 10 | 28 | Concept of effective mass of electron, Energy levels and energy bands, | 10 | To find the temperature coefficient of resistance by using Pt resistance thermometer by post office box. |
| 29 | Distinction between metals, insulators and semiconductors, |  |  |
| 30 | Hall effect and its Applications |  |  |
| 11 | 31 | Applications of Hall effect | 11 | To find the band gap of intrinsic semiconductor using four probe method. |
| 32 | Superconductivity: Introduction, |  |  |
| 33 | General features of Superconductors |  |  |
| 12 | 34 | Meissner effect, |  |  |
| 35 | Types of superconductors, |  |  |
| 36 | Elements of BCS theory, |  |  |
| 13 | 37 | London equations, |  |  |
| 38 | Applications of superconductivity. |  |  |
| 39 | Nanomaterials: Introduction, |  |  |
| 14 | 40 | Synthesis of nanomaterials: Top-down |  |  |
| 41 | Synthesis of nanomaterials: Bottom-up approach, |  |  |
| 42 | Sol-Gel method |  |  |
| 15 | 43 | Ball Milling methods |  |  |
| 44 | Properties of Nanomaterials |  |  |
| 45 | Applications of Nanomaterials |  |  |