**LECTURE PLAN**

**TEACHER’S NAME: U P Singh SEMESTER: IInd**

**SUBJECT: Engineering Physics I I SUBJECT CODE: RAS-201**

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| **Unit** | **Lecture No.** | **CONTENT** | **REFERENCES** |
| **I** | 1 | Crystal Structures Space lattice, basis, Unit cell, Lattice parameter | Engineering Physics by S.L.Gupta  Solid State Physics - by C. Kittel, |
| 2 | Seven crystal systems and Fourteen Bravais lattices |  |
| 3 | Co-ordination number |  |
| 4 | Atomic radius and Packing factor of different cubic structures |  |
| 5 | Crystal structure of NaCl and diamond |  |
| 6 | Lattice planes and Miller Indices |  |
| 7 | ,, ,, |  |
| 8 | Diffraction of X-rays by crystal |  |
| 9 | Laue’s experiment, Bragg’s Law, Bragg’s spectrometer |  |
| 10 | ,, ,, |  |
| 11 | Compton Effect |  |
| 12 | ,, ,, |  |
| **II** | 13 | Dielectric constant and Polarization of dielectric materials |  |
| 14 | Relation between E, D and P, Types of Polarization (Polarizability) |  |
| 15 | ,, ,, |  |
| 16 | Equation of internal fields in liquid and solid (One- Dimensional) |  |
| 17 | Claussius- Mossotti equation Frequency dependence of dielectric constant |  |
| 18 | Dielectric Losses |  |
| 19 | Important applications of dielectric material, Ferro electricity, Piezoelectricity |  |
| 20 | Magnetization, Origin of magnetic moment, |  |
| 21 | Dia, para and ferro magnetism, |  |
| 22 | Langevin’s theory for diamagnetic material |  |
| 23 | Phenomena of hysteresis and its applications |  |
| **III** | 24 | Equation of continuity, Maxwell’s Equations (Integral and Differential Forms) and its derivations, Displacement Current, | Introduction to Electrodynamics - by David J. Griffith, Materials Science and Engineering - by V. Raghavan |
| 25 | ,, ,, |  |
| 26 | ,, ,, |  |
| 27 | EM - Wave equation and its propagation characteristics in free space |  |
| 28 | non-conducting and conducting media |  |
| 29 | energy density of electromagnetic wave, Skin depth |  |
| 30 | ,, ,, |  |
| **IV** | 31 | Equation of continuity, Maxwell’s Equations (Integral and Differential Forms) and its derivations, Displacement Current, |  |
| 32 | ,, ,, |  |
| 33 | ,, ,, |  |
| 34 | EM - Wave equation and its propagation characteristics in free space |  |
| 35 | non-conducting and conducting media |  |
| 36 | energy density of electromagnetic wave, Skin depth |  |
| 37 | ,, ,, |  |
| 38 | Fermi energy, Position of Fermi level in intrinsic and in extrinsic semiconductors, Temperature dependence of conductivity in semiconductors |  |
| 39 | ,, ,, |  |
| 40 | ,, ,, |  |
| **V** | 41 | Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect) |  |
|  | 42 | Temperature dependence of critical field, London equations |  |
|  | 43 | Josephson theory, persistent currents, Type I and Type II superconductors |  |
|  | 44 | BCS theory (Qualitative), High temperature superconductors and Applications of Super-conductors |  |
|  | 45 | ,, ,, |  |
|  | 46 | Basic principle of Nanoscience and technology, | Introduction to Nanotechnology By Charles P.Poole |
|  | 47 | structure, properties and uses of Fullerene, |  |
|  | 48 | Carbon Nanotubes Single and double walled Nanotubes, |  |
|  | 49 | Synthesis of Nanotubes, Properties and Applications of Nanotubes. |  |
|  | 50 | ,, ,, |  |