**CURRICULUM PLAN 2024-25**

Odd Semester: I, III, V

**Dr. Savita Sharma**

Department of Physics

**DSE Paper: Physics of Materials**

**B.Sc. (H) Physics – III year, V Sem**

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| Content | Allocation of Lectures | Month-wise Schedule followed | Tutorial/assignment/presentation etc |
| **Heat & Thermodynamics** |  |
| **Unit – I – Semiconductors:**Basic concept of mobility and conductivity, density of states, determination of electron andhole concentration in doped semiconductor, Fermi level, Fermi energy, Fermi temperature,Fermi wavelength, Fermi surface | 4 | 2-Aug to 12 August | Syllabus OverviewReference booksDerivations and Numericals |
| Unit – II - Dielectric and magnetic materials: Dielectrics, Ferroelectric, Piezoelectric and Pyroelectric materials, applications offerroelectrics in capacitors and memory device, Piezoelectrics in micro positioner and actuator,Pyroelectrics in radiation detectors and thermometryClassification and applications of soft and hard magnetic materials, application in transformers,memory device, introduction of spintronics based systems (spin transport) | 9 | 13-Aug to 30 August | Derivations andNumericalsDiscussion ofImportant questions |
| **Unit – III – Polymers:**Chemical structure of polymers of few thermoplastic (polyethylene, PVC, PTFE, PMMA,Polyester, Nylons) and thermosetting (Epoxy resin) polymers, conducting polymersapplicationin organicelectronics | 3 | 2 Sep to 09-Sep | Derivations andNumericalsDiscussion ofImportant questionsHome Register Checking |
| **Unit – IV – Liquid crystals:**Classification of liquid crystals, structural and orientational ordering (isotropic to Nematic),thermotropic liquid crystals, Phases and phase transitions; anisotropic; Birefringence anddisplay devices | 3 | 10 Sept- to 16-Sept | Derivations andNumericals |
| **Unit – V – Carbon based materials:**Structure and properties of Fullerenes, C60, single walled and multi walled CNTs, Grapheneand their energy band diagram. | 03 |  17-Sept to 30-Sept | Derivations andNumericals |
| **Unit – VI – Synthesis of materials:**Ceramic (Calcination, Sintering, Grain), thin films (general idea of vacuum, thermalevaporation, molecular beam epitaxy, pulsed laser deposition), Crystals (qualitative idea ofzone refining and Czochralski method), Polymers (Polymerizatio**n mechanism)** | 08 | 1 October to 27 November | Derivations,Numericals, revisions and discussions on previous year question papers |