**Lesson Plan**

**MCM DAV College for Women, Sector – 36A, Chandigarh**

**Monthly Teaching Plans (Odd Semester/Even Semester)**

**Session – (2020-21)**

**Name of the Teacher: Dr. Pallavi Gupta**

**Department: Physics Department**

**Odd Semester**

**Physics, Paper A**

**Class: B.Sc. III(NM, Voc) Subject: Condensed Matter Physics I**

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| **S.No.** | **Date**  **(Monthly)** | | **Topics to be Covered** | **Academic Activity Undertaken\*** |
| **From** | **To** |
| 1 | 19/08/2020 | 31/08/2020 | Crystal structure: Symmetry operations for a two-dimensional crystal. Two dimensional Bravais lattices, Three dimensional Bravais lattices | PPT**,** Lecture Method |
| 2 | 01/09/2020 | 30/09/2020 | Basic primitive cells, Crystal planes and Miller indices Diamond and NaCl structure. Crystal diffraction: Bragg’s Law, Determination of crystal structure, Laue equations, | Lecture Method, PPT, Online Sources; Group Discussion |
| 3 | 01/10/2020 | 31/10/2020 | Reciprocal lattices of SC, BCC and FCC, Bragg’s law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, structure factor and atomic form factor. | Lecture Method, PPT, Online Sources |
| 4 | 01/11/2020 | 30/11/2020 | Free electron theory of metals, effective mass, drift current, mobility and conductivity (carrier concentration and mobility of carriers), variation of carriers with temperature in semi-conductors | Lecture Method, PPT, Online Sources; Group Discussion |
| 5 | 01/12/2020 | 31/12/2020 | Fermi level positions in intrinsic and extrinsic semiconductors, Wiedemann-Franz law, Hall effect in metals and semiconductors. | Lecture Method, Online Sources; Group Discussion |
| 6 | 01/01/2021 | 31/1/2021 | Band Theory of solids, periodic potential and Bloch theorem, Kronig-Penney model, band gaps, band structures in conductors | Lecture Method, PPT, Online Sources; Group Discussion |
| 7 | 1/02/2021 | 15/02/2021 | direct and indirect semiconductors and insulators, Numerical practise | Lecture Method, Online Sources; Group Discussion |

**Even Semester**

**Paper A**

**Name of the Teacher: Dr. Pallavi Gupta**

**Department: Physics Department**

**Class: B.Sc. III(NM, Voc) Subject: Condensed Matter Physics II**

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| **S.No.** | **Date\*\***  **(Monthly)** | | **Topics to be Covered** | **Academic Activity Undertaken\*** |
| **From** | **To** |
| 1 | 15/03/2021 | 31/03/2021 | Lattice Dynamics: Lattice vibrations and phonons, Scattering of photons by phonons, Dynamics of a linear chain of similar atoms and chain of two types of atoms, optical and acoustic modes, Density of modes. | PPT**,** Lecture Method |
| 2 | 01/04/2021 | 30/04/2021 | Einstein and Debye theories of specific heats of solids. Magnetic classification of materials (Dia, para, ferro, ferri, antiferro), Langevin theory of dia and paramagnetism, Quantum theory, Weiss’s theory of Ferromagnetism, temperature dependence, hysteresis of ferromagnetic materials. | Lecture Method, PPT, Online Sources; Group Discussion |
| 3 | 01/05/2021 | 31/05/2021 | Dielectric constant & polarizability, electric susceptibility, Clausius Mosotti equation, frequency dependence, ferroelectrics and Piezoelectrics. Liquid crystals, various types and properties. Applications. | Lecture Method, PPT, Online Sources |
| 4 | 01/06/2021 | 30/06/2021 | Superconductivity: Meisner effect, London’s equation and penetration depth, critical magnetic field and temperature, DC and AC Josephson effect, BCS theory (formation of cooper pairs), ground state and energy gap. Basic ideas of materials at nanoscale: Difference from bulk material properties | Lecture Method, PPT, Online Sources; Group Discussion |
| 5 | 01/07/2021 | 15/07/2021 | Nanoparticles, introduction to fabrication and characterization techniques, Carbon Nanostructures - nanotubes, grapheme. Applications of nanotechnology in various fields. | Lecture Method, Online Sources; Group Discussion |

**\*Any of these** – (i) Lecture Method; (ii) PPT; (iii) Online Sources; (iv) Group Discussion; (v) Case Studies etc.

Other Methods adopted by the teacher – Please write the specific teaching method

\*\* Dates for even semester are tentative; they can be varied according to Panjab University Academic Calendar Dates.