# Post Graduate Govt. College for Girls, Sector-42, Chandigarh

**Teaching Plan for Bachelors (First Semester)**

**Session (2020-2021)**

**Class:** **B.Sc 1st Semester**  **Name of the Teacher: Rajwinder Singh**

**Subject: Physics Paper: C**

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| **S. No** | **Dates** | **Topics to be Covered** |
| Week 1 | 01/09/2020-05/09/2020 | Basic ideas of Vector Calculus |
| Week 2 | 07/09/2020-12/09/2020 | Gradient, Divergence, curl in Cartesian coordinates and their useful relations |
| Week 3 | 14/09/2020-19/09/2020 | physical significance of Gradient, Divergence, curl and applications, Conservative field, Greens’s theorem in a plane |
| Week 4 | 21/09/2020-26/09/2020 | Stoke’s theorem, Gauss’s divergence theorem, Laplacian in Rectangular coordinates |
| Week 5 | 28/09/2020-03/10/2020 | Coulomb’s Law for point charges and continuous distribution of charges |
| Week 6 | 05/10/2020-10/10/2020 | electric field due to dipole, line charge, charged ring, circular disc and sheet of charge |
| Week 7 | 12/10/2020-16/10/2020 | Gauss’s Law and its differential form |
| Week 8 | 19/10/2020-24/10/2020 | Work and potential difference, Potential difference as line integral of field, Gauss’s law for dielectrics. |
| Week 9 | 27/10/2020-30/10/2020 | Electric potential due to dipole and quadrupole and its applications in Electrostatic field |
| Week 10 | 03/11/2020 – 07/11/2020 | Electric potential due to dipole and quadrupole and its applications in Electrostatic field contd. |
| Week 11 | 09/11/2020 – 12/11/2020 | Electric field as gradient of scalar potential, curl E = 0 |
| Week 12 | 16/11/2020 – 21/11/2020 | Calculation of E due to a point charge and dipole from potential. Poisson and Laplace’s equation |
| Week 13 | 23/11/2020 – 28/11/2020 | Calculation of electric potential and field due to a point charge placed near an infinitely conducting sheet. |
| Week 14 | 01/12/2020 – 05/12/2020 | Polarisation of matter, atomic and molecular dipoles, induced dipole moment and atomic polarizability |
| Week 15 | 07/12/2020 – 12/12/2020 | Concept of electrical images Electric susceptibility and polarization vector. Relation K= 1 + χ |
| Week 16 | 14/12/2020 – 18/12/2020 | Gauss’s law for dielectrics. Displacement vector, Div. D = 0 |
| Week 17 | 21/12/2020 – 26/12/2020 | Energy stored in dielectric medium |

**Post Graduate Government College for Girls, Sector-42, Chandigarh**

**Teaching Plan for Bachelors (Third and Fifth Semester) and Post Graduate (Third Semester)**

**Session (2020-2021)**

**Class: \*BSc 5th Semester**  **Name of the Teacher: Rajwinder Singh**

**\*\* BSc 3rd Semester**

**Subject: Physics Paper: A/C**

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| **S. No** | **Dates** | **Topics to be Covered** |
| Week 1 | 03/08/2020 – 08/08/2020 | \*Crystal structure: Symmetry operations for a two dimensional crystal  \*\*Plancks’s formula of Black body radiation. |
| Week 2 | 10/08/2020 – 14/08/2020 | \*Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells  \*\*Black body radiation and energy quantization |
| Week 3 | 17/08/2020 – 22/08/2020 | \*Crystal planes and Miller indices  \*\*Wave-particle duality – Photoelectric effect, X-ray diffraction, Compton effect, Pair production, Photon and gravity |
| Week 4 | 24/08/2020 – 29/08/2020 | \*Diamond and NaCl structure  \*\*De Brogile waves, wave packet, Phase velocity and Group velocity, Electron microscope, Particle in a box |
| Week 5 | 31/08/2020- 05/09/2020 | \*Crystal diffraction : Bragg’s Law, Determination of crystal structure  \*\*Particle diffraction, Davisson-Germer experiment, Interferferometry with particles. |
| Week 6 | 07/09/2020- 12/09/2020 | \*Laue equations, Reciprocal lattices of SC, BCC and FCC, Bragg’s law in reciprocal lattice  \*\*Uncertainty principle with illustrations, Principle of complementarity |
| Week 7 | 14/09/2020- 19/09/2020 | \*Brillouin zones and its derivation in two dimensions  \*\*Wave equation, Plausible arguments leading to time-dependent Schrodinger equations, Born’s interpretation of Wave function |
| Week 8 | 21/09/2020- 26/09/2020 | \*structure factor and atomic form factor  \*\*complex character, continuity and boundary conditions, probability interpretation, normalization, |
| Week 9 | 28/09/2020- 03/10/2020 | \*Band Theory of solids, periodic potential and Bloch theorem,  Operator formalism, Position, momentum and energy operators, expectation values, Ehrenfest theorem, Hermitian operators. |
| Week 10 | 05/10/2020- 10/10/2020 | \*Kronig-Penney model  \*\*Steady-state Schrodinger equation . |
| Week 11 | 12/10/2020- 16/10/2020 | \*band gaps, band structures in conductors  \*\*Potential step. potential barrier, Tunnel effect examples |
| Week 12 | 19/10/2020- 24/10/2020 | \*direct and indirect semiconductors and insulators  \*\*Appliction to stationary states for one dimension Scanning Tunneling microscope, rectangular potential well, Linear harmonic oscillator. |
| Week 13 | 27/10/2020- 30/10/2020 | \*Free electron theory of metals  \*\*SchrÖdinger equation for spherically symmetric potential, spherical harmonics |
| Week 14 | 03/11/2020- 07/11/2020 | \*effective mass, drift current, mobility  \*\*hydrogen atom energy levels and eigenfunctions |
| Week 15 | 09/11/2020- 12/11/2020 | \*conductivity (carrier concentration and mobility of carriers) and their variation with temperature in semi-conductors  \*\*Principal, Orbital and Magnetic quantum numbers |
| Week 16 | 16/11/2020- 21/11/2020 | \*Fermi level positions in intrinsic and extrinsic semiconductors  \*\*Electron probability density |
| Week 17 | 23/11/2020- 28/11/2020 | \*Wiedemann-Franz law, Hall effect in metals and semiconductors |