Semester - II (Core Course)	PHY220C: PHYSICS: ELECTRICITY AND MAGNETISM	Theory
04 Credits		60 Hours

Unit - I

Vector Integration, Line, surface and volume integrals of vector fields, Gauss-divergence theorem and Stoke's theorem of vectors, Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Differential form of Gauss Law. Green's function

Unit - II

Gauss' Law, Applications of Gauss Law (Point Charge, Charged Sphere, Charged Cylinder, infinite plane sheet of charge), Field inside a hollow conductor.

Line integral of electric intensity, potential difference and potential, Calculation of potential due to various charge distributions.

Capacitance, Calculation of capacitance in spherical, cylindrical and parallel plate capacitor, Effect of Dielectric.

Dielectrics. Gauss law in dielectric, electric displacement, Electric fileds in cavities of dielectrics, Clausius Mossoti equation, Polarizibility, Langvin-Debye equation.

Unit - III

Current, Current density, Equation of continuity, Conductivity and resistivity, Potential and resistance, Lorentz Drude theory and Ohm's law, Residual resistivity, Joule's law, Kirchoff's laws, Wheatstone bridge, Carey Foster's bridge.

Seeback effect, Peltier effect, Thomson effect, Laws of thermoelectric circuits, Applications of thermo-wmf

Unit - IV

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field. Maxwell`s equations and Electromagnetic wave propagation: Equation ofcontinuity of current, Displacement current, Maxwell's equations, Poynting vector,energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

Text Books:

1. *Electricity and Magnetism by Duggal and Chabra*
2. *Introduction to Electrodynamics by D. J. Griffiths*

Reference Books:

1. *Electricity and Magnetism by D. C. Tayal*
2. *Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I*

Semester - II (Core Course)	PHY220C: PHYSICS: ELECTRICITY AND MAGNETISM	Practical
02 Credits		60 Hours

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.

2. Ballistic Galvanometer: (i) Measurement of charge and current sensitivity (ii) Measurement of Critical Damping Resistance(iii) Determine a high resistance by Leakage Method(iv) To determine Self Inductance of a Coil by Rayleigh's Method.

3. To compare capacitances using De'Sauty's bridge.

4. Measurement of field strength B and its variation in a Solenoid/SG Method (Determine dB/dx).

5. To study the Characteristics of a Series RC Circuit.

6. To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.

7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.

8. To determine a Low Resistance by Carey Foster's Bridge.

9. To verify the Thevenin and Norton theorem.

10. To verify the Superposition, and Maximum Power Transfer Theorem

Reference Books:

1. *Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop,*

2. *A Text Book of Practical Physics, Indu Prakash and Ramakrishna*

3. *Engineering Practical Physics, S.Panigrahi & B.Mallick*

4. *Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn*