

	PVKN Govt. College (Autonomous) Chittoor	Program II B.Sc. Physics Hons.			
Course Code 24-PHY-4C9	TITLE OF THE COURSE Course - 9: Electricity and Magnetism	Semester-IV			
Teaching	Hours Allocated: 45 Hrs (Theory) (3 Hrs./wk.)	L	T	P	C

Syllabus:

UNIT-I Electrostatics and Dielectrics

Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere,

Electrical potential-Equipotential surfaces, Potential due to a uniformly charged sphere.

Dielectrics-Polar

and non-polar dielectrics- Effect of electric field on dielectrics, Dielectric strength, Electric displacement D, electric polarization Relation between D, E and P, Dielectric constant and electric susceptibility.

UNIT-II Current electricity

Electrical conduction-drift velocity-current density, equation of continuity, ohms law and limitations,

Kirchhoff's Law's, Wheatstone bridge-balancing condition - sensitivity. ~~Branch current method, Nodal~~

~~Analysis, star to delta & delta to star conversions.~~ Superposition Theorem, Thevenin's Theorem, Norton's

Theorem, Maximum power transfer theorem **and it's derivations.**

UNIT-III Magneto statics

Biot- Savart's law and its applications: (i) circular loop and (ii) solenoid, Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications.

Electromagnetic Induction:

Faraday's laws of electromagnetic induction, Lenz's law, Self-induction and Mutual induction, Self-inductance of a long solenoid, Magnetic Energy density. Mutual inductance of a pair of coils. Coefficient of Coupling.

UNIT-IV Electromagnetic waves-Maxwell's equations:

Basic laws of electricity and magnetism- Maxwell's equations- integral and differential forms Derivation,

concept of displacement current. Plane electromagnetic wave equation, Hertz Experiment- Transverse nature of electromagnetic waves. Electromagnetic wave equation in conducting media. Pointing vector **and Theorem**, and propagation of electromagnetic waves.

UNIT-V Varying and alternating currents:

Growth and decay of currents in LR, CR, LCR circuits-Critical damping. Alternating current - A.C. fundamentals, and A.C through pure R, L and C. ~~Relation between current and voltage in LR and CR circuits~~, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q -factor, Power in ac circuits, Power factor.