

ACADEMIC PLAN & UNITIZATION OF SYLLABUS

Department of PHYSICS

Bankura Christian College

ACADEMIC YEAR 2023-24 (**Semester -II**)

2nd Semester (March to June)

Core T3 - Electricity and Magnetism

1. Electric Field and Electric Potential

Electric field: Electric field lines. Electric flux. Gauss' Law with applications to charge distributions with spherical, cylindrical, and planar symmetry.

Conservative nature of Electrostatic Field. Electrostatic Potential. Laplace's and Poisson equations. The Uniqueness Theorem. Potential and Electric Field of a dipole. Force and Torque on a dipole.

Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and force on a conductor. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor. Uniqueness theorem (statement). Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere.

2. Dielectric Properties of Matter

Electric Field in matter. Polarization, Polarization Charges. Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric. Displacement vector D. Relations between E, P and D. Gauss' Law in dielectrics.

MONTH/YEAR	WEEK	PORTIONS
March 23	3	Introduction, Electric field: Electric field lines. Electric flux. Gauss' Law.
	4	Gauss' Law with applications to charge distributions with spherical, cylindrical, and planar symmetry.
	5	Conservative nature of Electrostatic Field. Electrostatic Potential. Laplace's and Poisson equations. The Uniqueness Theorem.
MONTH/YEAR	WEEK	PORTIONS
April 23	1	Potential and Electric Field of a dipole. Force and Torque on a dipole.
	2	Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field.
	3	Surface charge and force on a conductor. Capacitance of a system of charged conductors. Parallel-plate capacitor. Capacitance of an isolated conductor.
	4	Revision with Previous year question discussion
	5	Unit Test
MONTH/YEAR	WEEK	PORTIONS

May 23	1	Uniqueness theorem (statement). Method of Images and its application to: (1) Plane Infinite Sheet
	2	Method of Images and its application to: (2) Sphere.
	3	Revision with Previous year question discussion
	4	Unit Test
	5	Electric Field in matter. Polarization, Polarization Charges
MONTH/YEAR	WEEK	PORTIONS
June 23	1	Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric.
	2	Displacement vector D. Relations between E, P and D. Gauss' Law in dielectrics
	3	Revision with Previous year question discussion
	4	Revision with Previous year question discussion
	5	Unit Test



06.03.2023