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M: Course Objectives/Learning Outcomes

The student will be able to:

- 1) identify the following quantities and their appropriate units; electric charge; force; electric field, energy, potential, and potential difference; capacitance; permittivity; dielectric constant; electromotive force; current; resistance; resistivity; power; time constant; magnetic field; torque; permeability; magnetic flux; wavelength; frequency; index of refraction; focal length; radius of curvature; magnification; work function; disintegration constant; half-life; activity.
- 2) demonstrate an understanding of the following concepts, procedures, and principles through the solution of problems: Coulomb's law; electric field; vector addition of electric forces and fields; electric potential energy, potential, and potential difference; charged particle motion in electric field; capacitance; electric current; Ohm's law; resistance and resistivity; electric energy and power; resistor combinations; Kirchhoff's rules; magnetic force on moving charge; magnetic force on current carrying conductor; torque on a current loop; Biot-Savart law; Ampere's law; Faraday's law; Lenz's law; motional emf; electromagnetic waves; laws of reflection and refraction; polarization of light; image formation via mirrors and lenses; optical instruments; interference and diffraction of light; photoelectric effect; matter waves; periodic table; laser; radioactivity.
- 3) perform laboratory experiments and analyze the data obtained using appropriate graphing techniques, scientific notation, significant figures, and experimental uncertainty consideration.
- 4) write a formal laboratory report in the conventional format required for submissions to scientific journals.

N: Course Content**1. Electricity and Magnetism:**

Electrostatic force and field
 Electric potential
 Capacitance
 Direct current circuits
 Magnetic force
 Biot-Savart law and Ampere's law
 Electromagnetic induction
 Magnetic properties of materials

2. Optics:

Wave nature of light
 Reflection and refraction

3. Modern Physics:

Photon concept
 Photoelectric effect
 Matter waves
 Quantum numbers
 Periodic table
 Laser
 Nuclear properties
 Radioactivity

4. Laboratory Experiments:

Charged Particles in an

Electric Field

P: Textbooks and Materials to