

CAMOSUN COLLEGE

PHYSICS DEPARTMENT

PHYS 210 ELECTRICITY AND MAGNETISM

A calculus-based course in electricity and magnetism. Topics: electrostatics, capacitance, dielectrics, electric circuits, magnetic fields, electromagnetic induction, Maxwell's equations.

OFFERED:	Winter, Q1
CREDIT:	4
IN-CLASS WORKLOAD:	4 lec., 2 lab (W); 5 lec., 2 lab (Q)
OUT-OF-CLASS WORKLOAD:	6
PREREQUISITES:	Phys 115 or 120 or 125 and Math 101 and MATH 235B or admission to Eng. Bridge Program

OUTLINE

1. Electric charge: Electromagnetism as a fundamental force of nature; Coulomb's Law; conservation and quantization of charge.
2. The electric field: Electric field calculations for charge distributions of high symmetry; electric flux; Gauss' Law.
3. Electric Potential: Equipotential surfaces; calculation of potential due to charge distributions of high symmetry.
4. Capacitance: Combinations of capacitors; energy storage in capacitors; dielectrics
5. Current, resistance and circuits: A brief review of important concepts.
6. Magnetism: Force on a current - carrying conductor; torque on a current loop; the magnetic dipole; magnetic flux.
7. Ampere's Law: The Biot-Savart Law; Ampere's Law; magnetic force on a wire carrying a current; solenoids and toroids.
8. Electromagnetic induction: Faraday's Law; Lanz's Law; eddy currents.
9. Inductance: Capacitors and inductors; inductance; self-induction and the LR circuit; stored energy in the magnetic field of an inductor.

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10. Electromagnetic oscillations an alternating current: Damped LC oscillations; forced oscillations and resonance; the series LCR circuit; impedance; rms currents; the transformer.
 11. Maxwell's equations: Introduction to Maxwell's equations

In order to obtain a passing grade for this course, students must satisfactorily complete the lab component of the course.

TEXTS AND REFERENCES

"Physics" by Halliday, Resnick and Krane (Vol. II). 4th Edition extended, 1992
or similar textbook (contact instructor)