

## CAMOSUN COLLEGE

## PHYSICS DEPARTMENT

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**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

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**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)

*It is the policy of the physics department that instructors are not required to give make-up tests. At their discretion, instructors may give make-up tests in the case of documented excuses.*