

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.

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| OFFERED: | Q1 |
| CREDIT: | 4 |
| IN-CLASS WORKLOAD: | 4 hour lec., 1 hour seminar, 2 hour lab. |
| OUT-OF-CLASS WORKLOAD: | 6 hours |
| PREREQUISITES: | Admission to Eng. Bridge Program. |

OUTLINE

1. Electric charge: Electrostatic force 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; Lenz's Law; Eddy currents.
9. Capacitors and inductors; stored energy in the magnetic field of an inductor.
10. Maxwell's equations: Introduction to Maxwell's equations.

EVALUATION

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| Laboratory Performance and Reports | 10% |
| 3 quizzes | 40% |
| Final Exam | 50% |

In order to obtain a passing grade for this course, students must satisfactorily complete the lab component of the course. This involves performing all of the scheduled labs and submitting a report for each. A missed lab will result in an incomplete grade for the course.

TEXTS AND REFERENCES

" Physics for Scientists and Engineers" by Serway and Beichner, 5th Edition or .the 6th edition by Serway and Jewett.