

## PHYS 216 – Electricity and Magnetism

September 2024

Lecture	TWF	11:30am - 12:20pm	CRN 12730
Tutorial	T	1:30pm – 2:20pm	CRN 12734
Labs	weekly on Tuesday, Wednesday or Friday; first labs start 9 September		

Professor Bob Kowalewski, kowalews@uvic.ca

Tutorial instructor: Gholami Milani

Assignment marker: Arthur Santos

Office hours: TBA

### UVic Calendar Description:

Electric and magnetic fields, Gauss' law, electric potential, capacitance, dielectrics, current and resistance, resistivity, magnetic inductance. Faraday's law of induction, Ampere's law, energy stored in electric and magnetic fields.

### Level and emphasis

The course is designed for students who have **completed** one full year of university physics and calculus and are **currently enrolled** in vector calculus. E&M is a topic of foundational importance, both theoretically and practically. The goal is to build a mental model that will allow you to develop an intuition for E&M phenomena and provide you with the tools to perform (at least in principle) quantitative calculations. The mathematics will be kept as simple as possible. We will use *vector calculus* only in simplified geometrical situations. However, we will assume that you understand vectors (their structure and meaning) and *are competent* using vector operations (addition, dot and cross products), calculus (integration, differentiation, series expansions and limits) and, of course, geometry and algebra. E&M lends itself naturally to identifying and exploiting symmetries (ask yourself *why?*). We will use different coordinate systems (cartesian, cylindrical and spherical) to exploit these symmetries. We will learn to check that our results correspond to the expected answer in appropriate limits (e.g. when the system is seen from far away).

### Course Textbook

The required text book is freely available online: [openstax:university-physics-volume-2](https://openstax.org/r/university-physics-volume-2). We will cover chapters 5 through 16.

### Assignments

I will assign problems from the textbook and supplement them with problems I design; the latter will give you an idea of what to expect on exams. There will be 10 assignments; each counts for 1.5% of your final grade. The goal of the assignments is to give you practice working with the material, keep you on schedule (the assignments are due 3 days after the last lecture

on the associated material), and help you identify *where you need to seek help*. I will designate one problem per assignment to be handed in on Brightspace for marking (you can take screen shots of your work). Given the small value (1.5% of your final mark) associated with each individual assignment, **there will be no credit for late assignments**.

## Exams

All exams will be written in class (or in a supervised environment for those who have registered CAL accommodations) and marked by me. Students will normally write two midterm exams and one final exam. If you miss one of first two midterms, you must contact me for permission to take the third midterm; students who have written the first two midterms will **not** be eligible to write a third midterm. If you are unable to write two midterms, your final exam will count for more as indicated below:

	First midterm written	Second midterm written	Final exam
If you write 2:	15%	15%	35%
If you only write 1:	15%	-	50%

**You must pass the final exam to pass the course.** The dates of the exams are as follows

Midterm 1	Midterm 2	Midterm 3 (only if you're eligible)	Final exam
2 October	30 October	29 November	TBA

## Laboratory Sessions

The lab sessions are an integral part of the course – **you must pass the lab to pass the course**. All laboratory work must be completed before the end of the semester. If you show up and do the work, you'll pass the lab. Labs will be taught and marked by TAs.

## Assessments and Final Grade

The final grade is computed from the assignment mark (15%), lab mark (20%) and exams (65%, with the breakdown detailed above).

**Essential course requirements:** You must pass both the lab and the final exam to pass the course.

## Learning Resources

The primary resource for help in understanding the course material and assignments is the tutorial. The Physics Aid service provides TAs who can help as well. I will hold office hours – schedule TBA. There are good resources available online for help with E&M at this level – I encourage you to make use of them.

## **University policies**

The general UVic undergraduate course policies apply (see the “About this course” module on Brightspace for details). You are required to review and acknowledge the section on academic integrity and complete the associated checklist on Brightspace (you will not be able to access the assignments or exams until you have done this).