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<b>Physics 423</b>	<b>Electricity and Magnetism I</b>
Term:	Spring, 2021
Time:	MWF 2:10-3:00 pm
Location:	Barnard 108
Instructor:	Charles Kankelborg
Website:	<a href="http://solar.physics.montana.edu/kankel/ph423">http://solar.physics.montana.edu/kankel/ph423</a>
Office Location:	Barnard 260C
Virtual Office:	<a href="https://us02web.zoom.us/j/4707611297?pwd=OUFwWkRtTS80YnQyY1BIZVpyQWlPZz09">https://us02web.zoom.us/j/4707611297?pwd=OUFwWkRtTS80YnQyY1BIZVpyQWlPZz09</a>
Office Hours:	see <a href="http://solar.physics.montana.edu/kankel/Schedule.pdf">http://solar.physics.montana.edu/kankel/Schedule.pdf</a>
Grader:	Changsun Choi (firstnamelastname AT montana.edu)
Text:	David Griffiths, <i>Introduction to Electrodynamics</i> , 4th ed.

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## 1 Introduction

We will study static electric and magnetic fields and potentials, learn how they are modified by matter, and explore mathematical techniques to solve for them.

The electromagnetic force is the strongest of the four forces of nature. Electromagnetism is important to every field of physics. It is a critical ingredient in the structure of condensed matter and the phenomena of chemistry at microscopic scales. At astronomical scales, the electromagnetic force is responsible for solar flares, the aurora borealis, and the radiation beams of pulsars.

The theory of electromagnetic fields is conceptually and mathematically elegant. It employs much the same machinery as the theories of other continuous physical systems, e.g. fluid mechanics, elastic solids, and radiative transfer. The governing equations of electrodynamics, penned by James Clerk Maxwell in 1864, hinted subtly at special relativity about 40 years before Einstein.

## **2 Topics**

I plan to cover the first 5 chapters of Griffiths:

1. Vector Analysis
2. Electrostatics
3. Calculation of potentials
4. Electric fields in matter
5. Magnetostatics

## **3 Homework**

Homework assignments will be posted on the course website. It is your responsibility to check back frequently. Assignments will be due 2-3 times per week, via email to your grader, by midnight on the due date. You are expected to write clearly reasoned, complete solutions showing all of your work. You are encouraged to work together, but I expect you to work through each problem on your own and turn in your own solutions. Late homework will be penalized 10% of the points possible.

## **4 Exams**

Exams will be take home, and you will typically have 48 hours to do them. No collaboration whatsoever is allowed on the exams. You may refer to your notes, the assigned textbook, and materials provided on the course website. Other than the course website, no other resources are permitted. There will be no make-up exams, except by my permission under extraordinary circumstances.

## 5 Grading

	#	pts each	total pts
homework	~ 35	10	~ 350
chapter exams	4	50	200
final exam	1	100	100
		TOTAL	~ 650

The following targets may be lowered when I assign letter grades at the end of the semester, but I will not raise them.

A	95%
A-	90%
B+	85%
B	80%
C	70%