

Carleton University Physics Department

PHYS 2305 - Electricity and Magnetism (Winter 2021)

Course Outline

Instructor: Prof. Daniel Stolarski

Email: stolar@physics.carleton.ca

Official Schedule: Monday & Wednesday, 10:05 AM - 11:25 AM

This course is an online course where there is a mixture of synchronous meetings and asynchronous activities. This means students need to be prepared to meet some of the time online via Big Blue Button at the scheduled days and times. The specific dates will be communicated on cuLearn. The asynchronous activities are intended to provide flexibility to students when the class is not meeting synchronously. Students are expected to remain up to date with the deadlines and due dates provided. These courses require reliable high-speed Internet access and a computer (ideally with a webcam), and a headset with a microphone. This course has timed written assessments, which may consist of tests, midterms and/or final examinations. The Carleton University e-Proctoring system may be used in your assessments, and requires the use of webcams, microphones, and smart phones. If there are issues with equipment, please email as soon as possible.

Web conferencing sessions in this course may be recorded and made available only to those within the class. Sessions are recorded to enable access to students with internet connectivity problems, who are based in different time zone, and/or who have conflicting commitments. If students wish not to be recorded, they need to leave the camera and microphone turned off. You will be notified at the start of the session when the recording will start. Please note that recordings are protected by copyright. The recordings are for your own educational use, but you are not permitted to publish to third party sites, such as social media sites and course materials sites. You may be expected to use the video and/or audio and/or chat during web conferencing sessions for participation and collaboration. **If you have concerns about being recorded, please email me.**

Course Calendar Description: Electrostatic field and potential, Gauss' law. Properties of conductors. Magnetic effects from currents. Motion of charges in electric and magnetic fields. Energy in electric and magnetic fields. Electromagnetic induction. Maxwell's equations in vacuum using vector differential and integral calculus.

Prerequisites: You must have successfully completed:

1. PHYS 1001, or PHYS 1003, or PHYS 1007 with an overall grade of B- or higher.
2. PHYS 1002, or PHYS 1004, or PHYS 1008 with an overall grade of B- or higher.
3. MATH 2004.

Course webpage: See CULearn.

Required Textbook: David J. Griffiths, "Introduction to Electrodynamics," 4th Edition (Cambridge University Press, 2017). This course will be compatible with the 3rd Edition, students may use either. PHYS 3308 will use the same textbook.

Teaching Assistant: Carlos Henrique de Lima (CarlosHenriquedeLima@email.carleton.ca).

Office Hours: Prof. Stolarski will have office hours during the scheduled lecture times on days when there are not lectures (MW 10-11:30).

Carlos will have office hours by email appointment. You can ask either Carlos or Prof. Stolarski questions about the material or assignment problems, but for questions about assignment marking please contact Carlos.

Assignments and Marking

The components of the course are broken down as follows.

Lecture Questions: 10%

Each week there will be a series of lecture videos to watch. You will answer multiple choice questions based on the videos. The questions are intended to be straightforward to answer if you watch the videos, or read the equivalent chapter of the textbook. The lecture questions will be administered on cuLearn with the due date and time noted there.

Homework Assignments: 35%

Assignments will be given weekly and posted on CUlearn, with the due date and time noted there. Please scan and submit your solutions via cuLearn in a **single pdf file**.

Late assignments will not be accepted except for legitimate reasons such as illness. It is your responsibility to notify the instructor if you will be unable to hand in the assignment by the deadline.

The assignments are more technical and more challenging than the lecture questions. Working through problems is an essential part of developing a deep understanding of electricity and magnetism. This material is heavily math based, and is meant to provide a foundation for the mathematical aspects of physics that will come in future classes. **Students are encouraged to work together to understand the problems; however, the work handed in must be original.** Solutions showing significant overlap may have the mark divided by the number of people who provide that solution. Finding solutions to equivalent problems online is forbidden and considered an academic offence.

Students that are having significant difficulties with the material are encouraged to come to office hours. If the provided office hours do not work, accommodation can be made. Let me know as soon as possible, though, as I will not be able to accommodate last minute requests.

Midterm Exam: 20%

There will be an 80-minute midterm during the class time (10:05 - 11:25 AM) on February 10. A formula sheet will be provided (to be posted on CuLearn in advance). In the case of an exam deferral for legitimate reasons, please inform me within 24 hours of the regularly scheduled midterm to arrange a time to write the deferred exam.

Final Exam: 35%

The final exam will be held during on during the finals period in April and will be 3 hours long. A formula sheet will be provided. The final exam will focus on the material from the second half of the course.

In the event that a deferred exam is necessary, that exam will replace only the final exam component of the course mark, and will only be granted if adequate term work has been completed. Inadequate term work constitutes earning less than 15 of the 65 possible term marks.

Course Outline

Below is a rough outline of the course, but it may change to fit the pace needed.

Week	Textbook Sections	Topic Description
Jan 11	1.1 & 2.1	Course intro, vector algebra, Coulomb's law, Electric field, Continuous charge distribution
Jan 18	1.2 – 1.4	Differential and integral calculus, Curvilinear coordinates
Jan 25	1.6 & 2.2 – 2.3	Gauss' Law, Electric potential
Feb 1	2.3 – 2.4	Poisson's equation, Work and energy
Feb 8	2.5	Conductors
Feb 10		Midterm
Feb 15 & 17	Winter Break	No classes.
Feb 22	5.1 – 5.2	Lorentz force law, Biot–Savart law
Mar 1	5.3	Ampere's law
Mar 8	7.1 – 7.2	Electromotive force, Electromagnetic induction
Mar 15	7.3	Maxwell's laws
Mar 22	8.1 – 8.2	Conservation of charge, energy, and momentum
Mar 29	9.1 – 9.2	The Wave Equation, Electromagnetic waves
Apr 5		Catch up
Apr 12	Final class	Review, Homework 10 due

University policies

Grade Definition:

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59
A = 85-89	B = 73-76	C = 63-66	D = 53-56
A- = 80-84	B- = 70-72	C- = 60-62	D- = 50-52
F = <50			

WDN = Withdrawn from the course

ABS = Student absent from final exam

DEF = Deferred

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Academic Regulations, Accommodations, Plagiarism, Etc.:

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

Academic Integrity

The University Senate defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This can include:

- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in “substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.”

Plagiarism is a serious offence that cannot be resolved directly by the course’s instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized.

Penalties for plagiarism:

First offence: A grade of F in the course.

Second offence: A grade of F in the course and a one-term suspension from studies.

Third offence: Expulsion from the University.

Note: While these are the standard penalties, more severe penalties may be applied when warranted.

Course Copyright

Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copyright protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s).

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

Academic Accommodations

Text from <https://students.carleton.ca/course-outline/>

Carleton University is committed to providing access to the educational experience in order to promote academic accessibility for all individuals.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

Pregnancy Obligation:

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website

<https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>

Religious Obligation:

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website

<https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>

Academic Accommodations for Students with Disabilities:

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at **613-520-6608** or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website <https://carleton.ca/pmc>

- The deadlines for contacting the Paul Menton Centre regarding accommodation for final exams for the Fall exam period is **November 13, 2020** and for the Winter exam period is **March 12, 2021**.

Survivors of Sexual Violence:

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support>

Accommodation for Student Activities:

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the policy at <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

Assistance for Students:

Career Services: <https://carleton.ca/career/>

Academic Advising: <https://carleton.ca/academicadvising/>

Co-operative Education: <https://carleton.ca/co-op/>

Centre for Student Academic Support: <https://carleton.ca/csas/>

Writing Services: <https://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>

Freedom of Information and Protection of Privacy:

Carleton University is committed to protecting the privacy of those who study or work here (currently and formerly). To that end, Carleton's Privacy Office seeks to encourage the implementation of the privacy provisions of Ontario's *Freedom of Information and Protection of Privacy Act* (FIPPA) within the university.

In accordance with FIPPA, please ensure all email communication with staff/faculty is via your Carleton email account. To get your Carleton email you will need to activate your MyCarletonOne account through Carleton Central. Once you have activated your MyCarletonOne account, log into the MyCarleton Portal.

Important Dates:

<https://calendar.carleton.ca/academicyear/>

<https://carleton.ca/registrar/registration/dates-and-deadlines/>