

Physics 301 – Electricity & Magnetism

2024 – 2025, Winter Term 1

General Info

Course: Physics 301 (3 credits)
Sections: 001 (lecture) & S01 (seminar)
Pre-reqs: MATH 317, One of PHYS 121, 122
Lecture: MW 14:00–15:30 (FIP 239)
Seminar: Thu. 11:00–12:00 (SCI 236)

You **must** register for the lecture and the seminar

URL: <https://cmps-people.ok.ubc.ca/jbobowsk/phys301.html>



Instructor: Jake Bobowski
Office: SCI 266
Email: jake.bobowski@ubc.ca

Calendar Entry

Electric fields and potentials of static charge distributions, current, fields of moving charges, magnetic field, electromagnetic induction, Maxwell's equations.

Overview

Electrodynamics, the study of the interactions between electric and magnetic fields and their effects on matter, offers a profound glimpse into the fundamental forces that shape our universe. As you delve into this captivating field, you'll uncover the elegant symmetry that governs electromagnetic phenomena, from the intricate dance of charged particles to the far-reaching waves that traverse the cosmos. Electrodynamics not only illuminates the principles behind technologies that power our world, such as electric motors and wireless communication but also challenges our understanding of space and time itself. Embracing electrodynamics will not only enhance your grasp of the physical world but also ignite a sense of wonder about the interconnectedness of nature's forces, inspiring you to contribute to the next wave of scientific and technological breakthroughs.

Textbook

Introduction to Electrodynamics, Fifth Ed. by David J. Griffiths.

Earlier editions are okay.

Learning Outcomes

At the end of PHYS 301, successful students will be able to:

- Solve problems involving the calculation of fields, the motion of charged particles and the production of electromagnetic waves.
- Demonstrate a conceptual understanding of concepts in electrostatics and magnetostatics.
- Set up problems using diagrams, estimate answers, and make qualitative predictions about the outcomes of problems.
- Apply abstract concepts from electricity and magnetism to real-world situations.
- Use appropriate approximations to solve relatively complicated problems in electrodynamics.
- Solve problems in electrodynamics using vector notation and vector calculus.
- Students should see the various laws in the course, as described by Maxwell's equations, as part of a coherent field theory of electromagnetism.

Piazza

There will be a PHYS 331 Piazza page. It will be used to post information and notices that is relevant to physics students, but not directly tied to the PHYS 331 course. You can also use it to ask questions related to PHYS 301 homework assignments, labs, and lecture material and/or to initiate discussions with your classmates. To enroll in the PHYS 331 Piazza page:

- log in to the PHYS 301 Canvas shell
- retrieve the PHYS 301 Piazza access code
- follow the link provided in the Canvas shell to complete the registration

Office Hours

My office is SCI 266. Formal office hours will be announced in class and [published online](#). Otherwise, drop by or email me to schedule an appointment.

Evaluation¹

Assignments:	17.5%
Seminar:	7.5%
Midterm:	25%
Final Exam:	50%
	100%

Late Policy

Assignments will be due at the *start* of class. Late assignments will not be accepted. Assignments not submitted on time will receive a grade of zero. Assignments submitted by email will *not* be graded.

There will be one midterm which will be written in class in **Monday, October 21**. There will *not* be a make-up midterm.

Tentative Schedule²

Week	Topic
1	Vector Analysis (Chapter 1)
2	Vector Analysis (Chapter 1)
3	Electrostatics (Chapter 2)
4	Electrostatics (Chapter 2)
5	Potentials (Chapter 3)
6	Potentials (Chapter 3)
7	Magnetostatics (Chapter 5)
8	Magnetostatics (Chapter 5)
9	Electrodynamics (Chapter 7)
10	Electrodynamics (Chapter 7)
11	Electromagnetic Fields in Matter (Chapters 4 & 6)
12	Electromagnetic Fields in Matter (Chapters 4 & 6)
13	Electromagnetic Fields in Matter (Chapters 4 & 6)

¹Note that, the grading scheme is subject to change.

²Note that, the schedule is subject to change.

Official Policies of the Faculty of Science & CMPS Department

Missed Graded Work

Students who, because of unforeseen events, are absent during the term and are unable to complete tests or other graded work should generally discuss with their instructors how they can make up for missed work, according to written guidelines given to them at the start of the course (see Grading Practices). Instructors are not required to make allowance for missed tests or incomplete work not satisfactorily accounted for. If ill-health is an issue, students are encouraged to seek attention from a health professional. Campus Health and Counselling will usually provide the documentation only to students who have been seen previously at these offices for treatment or counselling specific to conditions associated with their academic difficulties. Students who feel that requests for consideration have not been dealt with fairly by their instructors may take their concerns first to the Head of the discipline and, if not resolved, to the Office of the Dean. Further information can be found at: <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0>. There will be no make-up midterm exams. If the absence is satisfactory, the weight of the student's final exam will be increased.

Grading Practices

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to university, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record: <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014>.

Final Examinations

The examination period for this term will be from Sunday, December 11th, 2022, to Thursday, December 22nd, 2022. Students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job. An examination hardship is defined as the occurrence of an examination candidate being faced with three (3) or more formal examinations scheduled within a 27-hour (inclusive) period.

Further information on Academic Concession can be found under Policies and Regulation in the Okanagan Academic Calendar: <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0>.

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise, and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at:

<https://okanagan.calendar.ubc.ca/campus-wide-policies-and-regulations/student-conduct-and-discipline/discipline-academic-misconduct>.

Cooperation versus Cheating

Working with others on assignments is a good way to learn the material and we encourage it. However, there are limits to the degree of cooperation that we will permit. Any level of cooperation beyond what is permitted is considered cheating.

When working on programming assignments, you must work only with others whose understanding of the material is approximately equal to yours. In this situation, working together to find a good approach for solving a programming problem is cooperation; listening while someone dictates a solution is cheating. You must limit collaboration to a high-level discussion of solution strategies and stop short of writing down a group answer. Anything that you hand in, whether it is a written problem or a computer program, must be written by you, from scratch, in your own words. If you base your solution on any other written solution, you are cheating. If you provide your solution for others to use, you are also cheating.

Copyright Disclaimer

Diagrams and figures included in lecture presentations adhere to Copyright Guidelines for UBC Faculty, Staff and Students (<http://copyright.ubc.ca/requirements/copyright-guidelines/>) and UBC Fair Dealing Requirements for Faculty and Staff (<http://copyright.ubc.ca/requirements/fair-dealing/>). Some of these figures and images are subject to copyright and will not be posted to Canvas. All material uploaded to Canvas that contain diagrams and figures are used with permission of the publisher; are in the public domain; are licensed by Creative Commons; meet the permitted terms of use of UBC's library license agreements for electronic items; and/or adhere to the UBC Fair Dealing Requirements for Faculty and Staff. Access to the Canvas course site is limited to students currently registered in this course. Under no circumstance are students permitted to provide any other person with means to access this material. Anyone violating these restrictions may be subject to legal action. Permission to electronically record any course materials must be granted by the instructor. Distribution of this material to a third party is forbidden.

Grievances & Complaints Procedures

A student who has a complaint related to this course should follow the procedures summarized below:

The student should attempt to resolve the matter with the instructor first. Students may talk first to someone other than the instructor if they do not feel, for whatever reason, that they can directly approach the instructor.

If the complaint is not resolved to the student's satisfaction, the student should e-mail the Department Head Dr. Sylvie Desjardins at cmeps.depthhead@ubc.ca.

Student Service Resources

Disability Resource Centre

The Disability Resource Centre (DRC) facilitates disability-related accommodations and programming initiatives that ameliorate barriers for students with disabilities and/or ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course, please contact the DRC at:

- room: UNC 215
- phone: 250.807.8053
- email: drc.questions@ubc.ca
- web: <https://students.ok.ubc.ca/academic-success/disability-resources/>

Equity & Inclusion Office

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.

- room: UNC 325H
- phone: 250.807.9291
- email: equity.ubco@ubc.ca
- web: www.equity.ok.ubc.ca

Office of the Ombudsperson for Students

The Office of the Ombudsperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving. If you require assistance, please feel free to reach out for more information or to arrange an appointment.

- room: UNC 328
- phone: 250.807.9818
- email: ombuds.office.ok@ubc.ca
- web: www.ombudsoffice.ubc.ca

Sexual Violence Prevention and Response Office (SVPRO)

A safe and confidential place for UBC students, staff and faculty who have experienced sexual violence regardless of when or where it took place. Just want to talk? We are here to listen and help you explore your options. We can help you find a safe place to stay, explain your reporting options (UBC or police), accompany you to the hospital, or support you with academic accommodations. You have the right to choose what happens next. We support your decision, whatever you decide.

Visit <https://svpro.ok.ubc.ca> or call us at 250-807-9640.

Independent Investigations Office (IIO)

If you or someone you know has experienced sexual assault or some other form of sexual misconduct by a UBC community member and you want the Independent Investigations Office (IIO) at UBC to investigate, please contact the IIO. Investigations are conducted in a trauma informed, confidential and respectful manner in accordance with the principles of procedural fairness.

You can report your experience directly to the IIO by calling 604-827-2060.

- email: director.of.investigations@ubc.ca
- web: <https://investigationsoffice.ubc.ca/>

Student Learning Hub

The Student Learning Hub is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with academic integrity, study skills and learning strategies**. Students are encouraged to visit often and early to build the skills, strategies and behaviours that are essential to being a confident and independent learner. For more information, please visit the Hub's website.

- room: LIB 237
- phone: 250.807.8491
- email: learning.hub@ubc.ca
- web: <https://students.ok.ubc.ca/academic-success/learning-hub/>

Student Wellness

At UBC Okanagan health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Student Wellness for more information or to book an appointment.

- room: UNC 337
- phone: 250.807.9270
- email: healthwellness.okanagan@ubc.ca
- web: <https://students.ok.ubc.ca/health-wellness/>

Safewalk

Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at 250-807-8076.

For more information, visit <https://security.ok.ubc.ca/safewalk/>