UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Physics & Astronomy
Science B 605
403 220-5385
phasoffice@phas.ucalgary.ca

COURSE OUTLINE

1. **Course:** PHYS 223, Introductory Electromagnetism, and Thermal Physics - Winter 2024

Coordinator(s)

Name	Email	Phone	Office	Hours
Dr Andrew Yau	yau@ucalgary.ca	220-8825	SB 623	By Appointment

Section(s)

Lecture 01 : MWF 12:00 - 12:50 in ENG 60

Instructor	Email	Phone	Office	Hours
Dr. Laura Mazzino	laura.mazzino@ucalgary.ca	403 220-8648	SB 533	Mon 2PM - 3PM, Wed 9:30AM - 10:30AM

Lecture 02 : TR 12:30 - 13:45 in ENG 60

Instructor	Email	Phone	Office	Hours
Dr. Laura Mazzino	laura.mazzino@ucalgary.ca	403 220-8648	SB 533	Mon 2PM - 3PM, Wed 9:30AM - 10:30AM

Lecture 03 : MWF 16:00 - 16:50 in ENG 60

Instructor	Email	Phone	Office	Hours
Dr. Ziad Abusara	zabusara@ucalgary.ca	Contact Via Email	SB 646	Friday 2:30-3:40

Communication guidelines:

Students are required to read and agree to the Communication Guidelines for this course, as posted on D2L. **Students MUST use their UCalgary email account for any communications.**

Students must include the following in the subject line:

- the course code (example: PHYS223 L01 W2024),
- their first and last name and
- their UCID number.

Correspondence from private accounts, other than the UofC official accounts, or without the required information in the subject line will NOT be answered.

For communications with the course coordinator, please use **phys211221f2023cc@ucalgary.ca**. Communications sent to the course coordinator's or your lecture section instructor's UCIT email address that are related to issues for the course coordinator to evaluate will not receive a response. When emailing phys211221f2023cc@ucalgary.ca, you must include in the subject line all the mandatory information outlined above INCLUDING your lecture section; for lab related issues, please insert your lab section as well.

When communicating with the instructors and course coordinator, please allow 3-5 workdays for a response to messages and e-mail inquiries.

Technical solutions to homework questions will not be provided by email. Students are expected to ask these types of questions in person.

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

This course has two in-person components: 1.1) Lectures and 1.2) Labatorials (Labs).

1.1) LECTURES:

There are 3 Lecture Sections in PHYS 223: L01-L03.

Lecture Sections L01 and L03 meet three times a week. Lecture Section L02 meets twice a week.

All PHYS 223 classes will meet in person and will not be recorded. The schedule for the topics of the lectures is shown in Table 1.

1.2) LABATORIALS (LABS):

There are multiple Lab Sections, which are held on different days and at different times of the week.

A student must enroll in one of the Lecture Sections and one of the Lab Sections, respectively.

All labatorials will be performed in person. The schedule for labatorials is shown in Table 2.

The lab sessions are designed as group work to be completed in real-time.

Lab manuals will be posted on the PHYS223 Lab D2L shell, which will open in the week of January 15, 2024. Lab manuals can be completed in hard copy or electronically. Each week, students are responsible for bringing a printed or electronic copy of the corresponding lab manual and they must complete it before the end of the lab section.

Additionally, students are required to fill in, before the start of their respective lab, a "pre-lab checklist section" to present to the TAs for evaluation, to be granted access to the labs, as indicated in the lab manuals.

Course Site:

PHYS 223 L01-L03 - (Winter 2024) - Introductory Electromagnetism, and Thermal Physics

Note: Students must use their U of C account for all course correspondence.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Physics and Astronomy EDI Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Associate Head EDI, Claudia Gomes da Rocha (claudia.gomesdarocha@ucalgary.ca)

2. **Requisites:**

See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s):
Physics 211 or 221 or 227.

3. **Grading:**

The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Quizzes [2][1]	20%	Ongoing		
Labatorials [8][2]	20%	Ongoing		
Assignments [12] [3]	20%	Ongoing		
Class participation [4]	5%	Ongoing		
Optional Research Survey[5]	0%	Ongoing		
Registrar Scheduled Final Exam[6]	35%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

[1] 2 quizzes worth 10% each: in-person during regularly-scheduled class on Wednesday or Thursday of the week; Quiz #1 in the week of Feb 12, 2024 and Quiz #2 in the week of March 18, 2024, respectively.

[2] 8 Labs. Best 7 of 8 labatorials (combinations of tutorial and laboratory components); 3% each; total grade capped at 20%.

[3] Approximately weekly homework sets administered using D2L; best 10 of 12 Homework assignments at 2% each, i.e., two lowest-grade and/or missed assignments will be dropped. Due on Wednesdays 8 pm. ***NO LATE ASSIGNMENTS ACCEPTED ***

[4] A variety of class activities specific to a Lecture Section will be implemented, and may include Pre-class Quizzes, in-class Top Hat, post-class Worksheets, and/or additional reading and/or review/research activities. The grading scheme will be defined by the Lecture Section Instructor at the beginning of the term.

[5] During the term, students will be invited to participate in a series of surveys administered by the research team from the Canadian Consortium of Science Equity Scholars. This study is external to the course, and your participation is entirely optional. Full details and informed consent information will be posted to the Course D2L. As an incentive to participate in this study, students will be given up to a 1.0% (total) bonus to their overall course grade, applied after the course total has been added. This total will be pro-rated based on the number of surveys submitted of the total (up to 3 surveys). The only information available to the course coordinator will be the list of participants for the purposes of applying this bonus: no other information about their survey responses will be shared by the study team.

[6] IN-PERSON 2 hrs. closed-book exam. Final exam is scheduled by the Office of the Registrar. Information about date/time of the final exam will be given to students by the last week of classes. Students MUST BRING THEIR OWN ELECTRONIC DEVICE AND CALCULATOR, of any kind, including graphing or programmable calculators. See the EXAM POLICY section for further details about the final exam.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

The percentage grade for the course must be equal to or larger than the stated value to obtain a certain letter grade, without rounding.

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. The Final Examination Schedule will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The University of Calgary offers a flexible grade option, Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade

4. **Missed Components Of Term Work:**

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation (Section M.1) for an excused absence, See FAQ.

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

**** PLEASE NOTE: NO LATE ASSIGNMENTS WILL BE ACCEPTED ****

** A grade of zero will be assigned to any assignment that misses the due date/time deadline. **

** The two lowest assignment grades, however, will be dropped. **

5. **Scheduled Out-of-Class Activities:**

   There are no scheduled out of class activities for this course.

6. **Course Materials:**

   Recommended Textbook(s):

   > Openstax, *University Physics, Volume 2* : This is an open-access, online textbook by Openstax, available at https://openstax.org/details/books/university-physics-volume-2.

   In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

   - A computer with a supported operating system, as well as the latest security, and malware updates;
   - A current and updated web browser;
   - Webcam/Camera (built-in or external);
   - Microphone and speaker (built-in or external), or headset with microphone;
   - Current antivirus and/or firewall software enabled;
   - Stable internet connection.

   For more information please refer to the UofC ELearning online website.

7. **Examination Policy:**

   No aids are allowed on tests or examinations.

   The quizzes and final exams are IN-PERSON closed-book exams.

   Students are only allowed to bring the provided formula sheet with NO edits or comments/notes on it.

   Students MUST BRING to the final exam and all quizzes a non-communicating CALCULATOR, of any kind, including graphing or programmable calculators.

   The use of camera devices, MP3 Players and headphones, or wireless access devices such as cell phones, Blackberries, iPads etc., during quizzes and examinations, will not be allowed. The use of the Internet apart from connecting and launching D2L or the use of notes in electronic format will not be allowed during the quizzes and final exam.

   FINAL EXAM: The final exam will be an in-person exam.

   QUIZZES: Quizzes are IN-PERSON and in the scheduled Lecture Section.

   Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory And Optional Course Supplemental Fees:**

   There are no mandatory or optional course supplemental fees for this course.

9. **Writing Across The Curriculum Statement:**

   For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:**

    Students will not participate as subjects or researchers in human studies.

    See also Section E.5 of the University Calendar.

11. **Reappraisal Of Grades:**

    A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

    a. **Term Work:** The student should present their rationale a s effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If

the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar

b. **Final Exam:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

12. **Other Important Information For Students:**

a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).

b. **SU Wellness Services:** For more information, see their website or call 403-210-9355.

c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed here.

d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

e. **Student Union Information:** SU contact, Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca,

f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the Request for Academic Accommodation Form and sending it to Dr. David Feder by email phas.ahugrd@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

g. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional Code of Conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

Student Handbook on Academic Integrity
Student Academic Misconduct Policy and Procedure
Faculty of Science Academic Misconduct Process
Research Integrity Policy

Additional information is available on the Student Success Centre Academic Integrity page

h. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

Table 1 - PHYS 223 W2024 Lecture Schedule

Note: Precise (week-to-week) lecture schedule subject to change

Week	Mon	Fri	Topics
1	1/8/2024	1/12/2024	Coulomb's law. Electric field of a point charge.
2	1/15/2024	1/19/2024	Distributions of point charges. Electric field of continuous charge distributions. Parallel plate capacitors.
3	1/22/2024	1/26/2024	Motion of charged particles in E fields. Electric potential energy of point charges. Electric Potential. V in a capacitor.
4	1/29/2024	2/2/2024	V due to point charges. The connection between E and V. E fields of charged conductors.
5	2/5/2024	2/9/2024	Capacitance and Capacitors. Resistance and Ohm's law. DC circuits.
6	2/12/2024	2/16/2024	Introduction to magnetism. Currents and magnetic fields.
	2/19/2024	2/23/2024	[Reading Week]
7	2/26/2024	3/1/2024	Lorentz force. Cyclotron motion. Hall Effect. Magnetic forces on straight wires and current loops.
8	3/4/2024	3/8/2024	Induced current. Motional emf. Magnetic flux. Lenz's Law.
9	3/11/2024	3/15/2024	Concepts of Pressure. Gauge Pressure. Thermodynamic state variables. Temperature. Phase changes.
10	3/18/2024	3/22/2024	Ideal gases. Ideal gas processes. pV diagrams. Work in ideal gas processes. Heat.
11	3/25/2024	3/29/2024	First Law of thermodynamics. Thermal properties of matter. Calorimetry. Specific heats of gases.
12	4/1/2024	4/5/2024	Gas particle collisions and resulting temperature and pressure. Thermal energy and Specific Heat.
13	4/8/2024	4/12/2024	Review [Last Day of Class: Tue 4/9] [Start of Final Exam: Fri 4/12]

Table 2 - PHYS 223 Lab Schedule

Note: Lab Schedule may be subject to changes due to constraints in lab resource allocations

Week	Week of*	Lab [1]
1	1/8/2024	
2	1/15/2024	NO LABS
3	1/22/2024	Lab 1 Electric Charges and Forces
4	1/29/2024	Lab 2 Electric Fields amnd motion of charged particles
5	2/5/2024	Lab 3 Equipotential Lines
6	2/12/2024	NO LABS [2]

	2/19/2024	NO LABS - READING WEEK
7	2/26/2024	Lab 4 Electric Circuits
8	3/4/2024	Lab 5 Magnetic Field in a Slinky
9	3/11/2024	Lab 6 Charge to mass ratio experiment
10	3/18/2024	NO LABS [3]
11	3/25/2024	Lab 7 Pressure and Density
12	4/1/2024	Lab 8 First Law of Thermodynamics
13	4/8/2024	NO LABS

Course Outcomes:

- By the end of the course, students will be expected to: Exploit and use symmetry to simplify physical problems in electricity and magnetism;
- Apply the principle of superposition to calculate the electric and magnetic fields of extended objects;
- Develop mathematical models of physical situations for electromagnetism and thermal physics;
- Carry out calculations symbolically (in terms of physical variables) and numerically (using appropriate values and their units);
- Obtain experimental data and relate them to predicted physical laws governing electricity and magnetism;
- Communicate and collaborate effectively within a team environment.

Electronically Approved - Jan 04 2024 14:49

Department Approval