



COURSE OUTLINE

1. **Course:** PHYS 323, Optics and Electromagnetism - Fall 2021

Lecture 01: MWF 09:00 - 09:50 in ENA 101

Instructor	Email	Phone	Office	Hours
Dr Christopher Cully	cmcully@ucalgary.ca	403 220-6088	SB 631	MW 10-11

In Person Delivery Details:

This course will have in-person lectures, labs and exams. Attendance at the lectures is optional but highly recommended. Lectures will be recorded and put on D2L. Attendance at the labs and exams is compulsory. For information on missed labs and exams, see below. Safety protocols for in-person labs will be discussed during the first week of classes. Face masks are to be worn as per University policy.

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

Course Site:

D2L: PHYS 323 L01-(Fall 2021)-Optics and Electromagnetism

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

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s):

Physics 223 and 3 units from Physics 211, 221 or 227; and 3 units from Mathematics 249, 265 or 275.

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:

Component(s)	Weighting %	Date
Assignments (8)	20	Weekly, online (see Course Materials section for details)
Laboratory (6)	25	
Quizzes (3)	25	In class: Oct 1, Oct 22, Nov 19
Final Exam	30	TBA (scheduled by the registrar)

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 %

This course will have a final exam that will be scheduled by the Registrar. [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:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness 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. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

Missed Quizzes

Students who miss a quiz should email the instructor immediately and provide a reason for their absence. A quiz missed for a legitimate reason (e.g. due to illness etc...) will be accommodated by re-distributing the grade weight to the other 2 quizzes. Absences not reported within 48 hours will not be accommodated.

Missed Laboratory

Due to COVID-related restrictions, students are **NOT** permitted to attend a lab section different than the one in which they are registered. Please fill in the "Make-up lab request" form on D2L and submit it to the Dropbox on D2L to request a make-up lab. Priority for scheduling make-up labs will be given to students who missed a lab for a legitimate reason. Make-up labs may require additional work at home. Requests submitted more than 7 days after the date of the missed lab will not be considered.

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

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

For students in lab section B07, please consult the addendum regarding labs scheduled for Sept 30.

6. **Course Materials:**

Required Textbook(s):

Randall Knight, *Physics for Scientists and Engineers, 4th or 5th ed* Pearson.

Mastering Physics Assignments: Online assignments will be employed in this course using the Mastering Physics online assessment tool. Mastering Physics can be accessed through an existing account or a new code from the bookstore package. A limited number of access codes are available for students who do not have access to the required textbook. These access codes will only allow students to complete the assignments; they will not provide access to the required textbook itself. Instructions for requesting one of these access codes will be posted on D2L.

Assignments will typically be made available on Fridays and be due on the following Sunday evening at 11:59 PM. To access the assignments, use the link on D2L (not the login at www.masteringphysics.com). Detailed instructions will be posted on D2L.

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:

Non-communicating calculators will be allowed during the quizzes and final exam.

Formula sheets will be provided.

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 as 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 www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel: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](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>).
- d. **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](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. 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.

f. 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.

g. Student Union Information: [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.

h. 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.

i. 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.

Tentative lecture schedule:

Dates	Topics	Text Section	Quiz
Sept 8/10	Electric fields of point charges	22.4, 22.5	
Sept 13/15/17	Continuous charge distributions	23.1 - 23.7	
Sept 20/22/24	Electric flux and Gauss' Law	24.1 - 24.6	
Sept 27/29/Oct 01	Biot-Savart and Ampere's Laws	29.3 - 29.6	Fri Oct 1
Oct 4/6/8	Induced Electric Fields	30.3 - 30.6	
Oct 13/15	Maxwell's Equations	31.2 - 31.5	
Oct 18/20/22	Power and Intensity, Polarization	16.3,16.5,16.7,16.8,31.6,31.7	Fri Oct 22
Oct 25/27/29	Interference in 1D and 2D	17.1 - 17.3, 17.5 - 17.8, 33.2	
Nov 1/3/5	Diffraction, interference	33.3 - 33.8	
Reading Week			
Nov 15/17/19	Reflection, Refraction	34.1 - 34.4	Fri Nov 19
Nov 22/24/26	Thin Lenses, Spherical Mirrors	34.5 - 34.7	
Nov 29/Dec 01/03	Optical Instruments	35.1 - 35.7	
Dec 6/8	Review		

Lab schedule:

Week of:	B02 Mon 10-12:50	B03 Wed 10-12:50	B04 Tues 13-15:50	B05 Tues 12-14:50	B06 Mon 14-16:50	B07 Thurs 14-16:50
Sept 8	No labs					
Sept 13		Lab 1		Lab 1		Lab 1
Sept 20	Lab 1		Lab 1		Lab 1	
Sept 27		Lab 2		Lab 2		University closed
Oct 4	Lab 2		Lab 2		Lab 2	Lab 2 (see below)
Oct 11		Lab 3		Lab 3		Lab 3
Oct 18	Lab 3		Lab 3		Lab 3	
Oct 25		Lab 4		Lab 4		Lab 4
Nov 1	Lab 4		Lab 4		Lab 4	
Reading Week						
Nov 15		Lab 5		Lab 5		Lab 5
Nov 22	Lab 5		Lab 5		Lab 5	
Nov 29		Lab 6		Lab 6		Lab 6
Dec 6	Lab 6		Lab 6		Lab 6	

For students in lab section B07: In observance of the new statutory holiday on Thursday, September 30, labs will not occur on September 30. Students with labs scheduled for September 30 (i.e. section B07) will be responsible for completing Lab 2 in a make-up session at an alternative time. A special make-up session for section B07 will be offered at the regularly-scheduled time (14:00-16:50) on Thursday Oct 7. Students in section B07 who cannot attend the Oct 7 session will be accommodated by individually arranging an alternative time. Due to COVID-related restrictions on lab capacity, students may not attend a different session than the one in which they are registered. If you have any questions or concerns, please reach out to your instructor or coordinator.

Lab 1: Measurement Uncertainty

Lab 2: Gauss's Law

Lab 3: Biot-Savart Law

Lab 4: Malus's Law and birefringence

Lab 5: Fraunhofer Diffraction

Lab 6: Concave Mirrors

Course Incomes:

This course is the natural follow-up to PHYS 223. Students should be comfortable with the concepts of electric

and magnetic fields learned there. Should be comfortable working with algebra, vectors, derivatives, and integrals. Students will build on the mathematical skills developed in PHYS 223, and/or other introductory physics and math courses.

Course Outcomes:

- By the end of the course students will have built on the physical principles and mathematical skills they learned in PHYS 223 and should be able to:
- Use Gauss's law to find the electric field of a continuous charge distribution;
- Work with electric field and magnetic field vectors in three dimensions;
- Use Maxwell's equations to show how light can be explained in terms of electromagnetic waves;
- Obtain experimental data and relate them to predicted physical laws governing electricity and magnetism;
- Analyze optical systems consisting of lenses and mirrors;
- Understand the effects of constructive and destructive interference, refraction, and diffraction of light.

Electronically Approved - Sep 06 2021 08:44

Department Approval

Electronically Approved - Sep 07 2021 09:45

Associate Dean's Approval