



**COURSE OUTLINE**

1. **Course:** PHYS 223, Introductory Electromagnetism, and Thermal Physics - Winter 2019

Lecture 01: MWF 12:00 - 12:50 in ENA 201

Instructor	Email	Phone	Office	Hours
Dr. Anna Harlick	anna.harlick@ucalgary.ca	403 220-8648	SB 533	Every Day, 10:00 am - 11:00 am

Lecture 02: TR 12:30 - 13:45 in ICT 102

Instructor	Email	Phone	Office	Hours
Dr. Anna Harlick	anna.harlick@ucalgary.ca	403 220-8648	SB 533	Every Day, 10:00 am - 11:00 am

Lecture 03: MWF 16:00 - 16:50 in ICT 102

Instructor	Email	Phone	Office	Hours
Dr. Ziad Abu Sara	zabusara@ucalgary.ca	403 220-3041	SB 130	M 2:00 - 3:50

**Coordinator(s)**

Name	Email	Phone	Office	Hours
Dr. Marzena Kastyak-Ibrahim	phascrscoord@ucalgary.ca	403 220-8073	SB 527A	Mondays 14:45-15:45; Fridays 10:00-11:00

**Course Site:**

D2L: PHYS 223 L01-L03 - (Winter 2019) - Introductory Electromagnetism, and Thermal Physics

PHYS 223 B01-B36 - (Winter 2019) - Laboratorials

**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 211 or 221 or 227.

**Note(s):**

- a. For students intending to major in Biological Sciences, Chemistry, Geology, or Geophysics.

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 (Mastering Physics)	15	
Labatorials	15	Beginning the week of January 21
Activities	10	(5% pre- and post lecture questions + 5% in-class activities)
Quiz	10	In-class (Monday Feb 4 or Tuesday Feb 5, 2019)
Midterm examination	20	Tue, Feb 26, 2019 19:00-21:00, rooms TBA
Final examination	30	To be scheduled by the registrar office

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.

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

A student's final letter grade will be determined using the percentage to letter grade conversion scale below unless that student falls within the following exception: if the student's overall course grade is greater than 50%, but the student receives less than 50% weighted average on the quiz, midterm and final examination OR receives 0% on the final exam, the student will receive a D in the course.

This course has a registrar scheduled final exam.

As your term work items (labs, assignments and exams) accumulate, the marks for students in Phys 223 will be posted on D2L. The marks that appear on this website are the marks that will be used to determine each student's overall course grade. Check your marks frequently. **Missing or incorrectly posted term work marks should be reported to your instructor as soon as they are noticed.** You should be prepared to produce the original work to verify the requested correction.

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

In the event that a student misses the midterm or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration will be required (see [Section N.1](#); for more information regarding the use of statutory declaration/medical notes, see [FAQ](#)). Absences must be reported within 48 hrs.

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize themselves with these regulations. See also [Section E.3](#) of the University Calendar.

##### Missed quiz

Students who miss the quiz for a valid reasons, will be granted an excused absence by the Course Coordinator provided that alleged problems are supported in writing by a person in a position of authority. Students must notify the Course Coordinator by submitting the form: Missed Quiz (Folder: Missed course components) to the D2L Dropbox: Missed Quiz the day after the In-class quiz, at the latest. Once the claim is substantiated, the weight of the Quiz will be shifted to the midterm. Sleeping in, missing the bus, forgetting etc. is NOT considered a legitimate reason.

##### Missed midterm

Students who miss the midterm for a valid reasons, will be granted an excused absence by the Course Coordinator provided that alleged problems are supported in writing by a person in a position of authority. Students must notify the Course Coordinator by submitting the form: Missed midterm (Folder: Missed course components) to the D2L Dropbox: Missed midterm the day after the In-class quiz, at the latest. Once the claim is substantiated, the weight of the midterm will be shifted to the final exam. Sleeping in, missing the bus, forgetting etc. is NOT considered a legitimate reason.

##### Missed Labatorials

Students are NOT allowed to come to a lab section different than their own. Please fill in the Make-up lab request form (should be saved as an Excel file) posted on D2L (Folder: Missed course components) and submit it to the Dropbox: Missed Labs. Priority for scheduling a make-up lab will be given to students who missed a lab for a legitimate reason. A supporting document should be provided when applicable. Requests submitted more than **7 days** after the date of the missed lab will not be considered. Requests will be evaluated periodically and the final list of students scheduled for a make-up lab will be prepared during the 12th week of classes. Make-ups for all labs will be scheduled during the 13th week of classes. You can make up one lab. In case of special circumstances, please contact the Course Coordinator (preferably come for office hours to discuss the issue).

##### Missed assignments

Please contact the Course Coordinator (preferably come to office hours) if you have a legitimate reason for missing a deadline for an assignment. Sleeping in, forgetting about the deadline etc. is NOT considered a legitimate reason.

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

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm Exam	Will be posted in D2L one week before the Midterm Exam	Tuesday, February 26, 2019 at 7:00 pm	120 Minutes

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

## 6. Course Materials:

Recommended Textbook(s):

R.D. Knight, *Physics for Scientists and Engineers: A Strategic Approach, 4th Edition*, : Addison-Wesley . : Wiley.

- Mastering Physics license (see information about on-line Assignments below).
- A TopHat license (free for UC students at tophat.com) and a response device such as a phone, laptop or tablet.
- Lectures will be posted on D2L (free of charge).

## 7. Examination Policy:

No aids are allowed on tests or examinations. Closed book in -class quizzes with formula sheet provided; calculator allowed.

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.

- Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections [I.1](#) and [I.2](#) of the University Calendar
- 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:

- 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](#)).
- SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).

- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. 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](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).
- Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Physics & Astronomy, Dr. David Feder by email [phas.ahugrd@ucalgary.ca](mailto:phas.ahugrd@ucalgary.ca) or phone 403-220-8127. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.
- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). 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.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **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.
- l. **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.

## LABATORIALS

Labatorials begin on Monday Jan 21, 2019. They take place in ST 030, 032 and 034, and students will have been assigned to a particular room by the Registrar's Office when enrolling in Physics 223. In general, the format of the labatorials is as follows: Working in groups, students make their way through a carefully written workbook crafted to help students ponder, discuss, and learn concepts being covered in their lectures. TAs offer assistance and guidance, and check student understanding periodically throughout the session. Labatorials typically involve a class demonstration, computer simulations, or some apparatus, and the tasks presented to students vary accordingly.

The Labatorials workbook documents will be available on D2L. Students are to print out their own copies (or bring a tablet with a pen) and take them to their Labatorials section to do their work.

PHYS 223 Labatorial schedule

Week	Dates	Labatorial
1	Jan 10-11	NO LABATORIALS
2	Jan 14-18	NO LABATORIALS
3	Jan 21-25	Labatorial 1
4	Jan 28-Feb 1	Labatorial 2
5	Feb 4-8	Labatorial 3
6	Feb 11-15	Labatorial 4
7	Feb 25- Mar 1	NO LABATORIALS (Midterm week)
8	Mar 4-8	NO LABATORIALS
9	Mar 11-15	Labatorial 5
10	Mar 18-22	Labatorial 6
11	Mar 25-29	Labatorial 7
12	Apr 1-5	Labatorial 8
13	Apr 8-12	Make-up labatorials

- Labatorial 1    Electric Charges and Forces
- Labatorial 2    Electric Fields
- Labatorial 3    Equipotential Lines
- Labatorial 4    Electric Circuits
- Labatorial 5    Magnetic Field in a Slinky
- Labatorial 6    Charge to mass ratio experiment
- Labatorial 7    Ideal Gas Law
- Labatorial 8    First Law of Thermodynamics

## Mastering Physics On-line ASSIGNMENTS

Mastering Physics assignments are due by 23:59 on Wednesday nights. The first graded assignment is due Wednesday, January 30th, 2019. Please note that a new assignment opens every week and the assignments remain open for two weeks. At any given point two assignments will be open. A practice, not for credit, MP assignment will be made available for students to attempt (Assignment 0). Please see detailed schedule of the assignments below.

PHYS 223 Assignment schedule

Assignment	Available	Due Date
Assignment 0	January 10, 2019	January 16, 2019
Assignment 1	January 16, 2019	January 30, 2019
Assignment 2	January 23, 2019	February 6, 2019
Assignment 3	January 30, 2019	February 13, 2019
Assignment 4	February 6, 2019	February 27, 2019
Assignment 5	February 13, 2019	March 6, 2019
Practice midterm	February 13, 2019	No due date
Assignment 6	March 6, 2019	March 20, 2019
Assignment 7	March 13, 2019	March 27, 2019
Assignment 8	March 20, 2019	April 3, 2019
Assignment 9	March 27, 2019	April 10, 2019
Assignment 10	April 3, 2019	April 12, 2019
Practice Final	April 3, 2019	No due date

Please see D2L folder Content/ Mastering Physics for detailed visual instructions how to access MP if:

- You have a Mastering Physics account from Fall 2018
- You don't know if you have a Mastering Physics account or forgot the password for your account
- You don't have a MasteringPhysics account but you want to register the code that came with your copy of the package from the bookstore.
- You don't have a MasteringPhysics account but you only want access to the assignments without purchasing access to the extra study resources or the eText.

## ACTIVITIES

In order to help students to better understand and learn course material there will be additional activities. Participation in activities will earn students 10% toward their overall course grade.

- In class activities (5%)
- Pre-and post lecture question (5%), pre-lectures questions will be due at the time the class starts and post-lecture questions will open when the class ends and will remain open till the next class.

As a vehicle to encourage class participation and student interaction as well as providing instructors with rapid, in-class feedback, the TopHat system will be employed. A demonstration of this system could happen in your lecture section in the first week of classes. **Each lecture section will have its own TopHat course name which will be given to you by your instructor.** The type and number of response questions you will encounter over the semester is at the sole discretion of your instructor.

## PHYS 223 DETAILED LECTURE SCHEDULE

PHYS 223 Lecture schedule

Week	Dates	Text	Topic
1	Jan 10-11	N/A	Introduction.
2	Jan 14-18	22.1-5, 23.1-2	Coulomb's law. Electric field of a point charge and distributions of point charges.
3	Jan 21-25	23.3; 6-7	Electric field of continuous charge distributions. Parallel plate capacitors. Motion of charged particles in E fields.
4	Jan 28-Feb 1	25.1 - 7	Electric potential energy of point charges. Electric Potential. V in a capacitor. V due to point charges.
5	Feb 4-8	26.1 - 5	The connection between E and V. E fields of charged conductors. Capacitance and Capacitors.
6	Feb 11-15	27.1 - 5, 28.1 - 7	Resistance and Ohm's law. DC circuits.
7	Feb 25 - Mar 1	29.1 - 5	Introduction to magnetism. Currents and magnetic fields.
8	Mar 4-8	29.7 - 9	Lorentz force. Cyclotron motion. Hall Effect. Magnetic forces on straight wires and current loops.
9	Mar 11-15	30.1 - 4	Induced current. Motional emf. Magnetic flux. Lenz's Law.
10	Mar 18-22	14.1 - 3, 18.1 - 5	Concepts of Pressure. Gauge Pressure. Thermodynamic state variables. Temperature. Phase changes.
11	Mar 25-29	18.6 - 7, 19.1 - 3	Ideal gases. Ideal gas processes. pV diagrams. Work in ideal gas processes. Heat.
12	Apr 1-5	19.4 - 7	First Law of thermodynamics. Thermal properties of matter. Calorimetry. Specific heats of gases.
13	Apr 8-12	20.1-4, 19.8	Gas particle collisions and resulting temperature and pressure. Thermal energy and Specific Heat. Heat-Transfer Mechanisms.

### COURSE INCOMES:

Students coming into PHYS 223 should be able to:

- Perform basic derivatives and integrals
- Apply vector notation and algebra in one and two dimensions
- Develop mathematical models of physical situations

### 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.

Department Approval:

Electronically Approved

Date: 2019-01-03 16:51

Associate Dean's Approval for out of regular class-time activity:

Electronically Approved

Date: 2019-01-04 10:28