UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Physics & Astronomy
Science B 605
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COURSE OUTLINE

1. **Course:** PHYS 259, Electricity and Magnetism (for students in Engineering) - Summer 2023

   Lecture 01 : TR 09:00 - 11:45 in SA 119 and W 08:00 - 09:50 in SA 119

Instructor	Email	Phone	Office	Hours
Reihaneh Ghaffari	reihaneh.ghaffari@ucalgary.ca	TBA	SB 504A	Tue-Thu 11-12

   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:

   During the weekly synchronous classes, students will be sitting in their groups, and there will be a Lecture TA present to help the instructor. When the students are working on a task (TopHat and group activity), the instructor and the TA will be around in the room helping the groups and answering any questions they have.

   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. **Online Delivery Details:**

   This course does not follow a scheduled meeting pattern.

   The students will watch three asynchronous videos on the D2L before each session of the in-person activity class. Recording of all lecture materials will be placed on D2L in the respective folders.

   Course Site:

   D2L: PHYS 259 L01-(Summer 2023)-Electricity and Magnetism (for students in Engineering)

   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):
   Mathematics 211 and 3 units from Mathematics 265 or 275 and admission to the Schulich School of Engineering.

   Antirequisite(s):
   Credit for Physics 259 and either 255 or 355 will not be allowed.

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
Assignments (online)[1]	12%	Ongoing		
Labatorials[2]	18%	Ongoing		
In class activities[3]	15%	Ongoing		
Midterm examination[4]	20%	Jul 19 2023 at 08:00 am (2 Hours)	in-person	In Class
Registrar Scheduled Final Exam	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] 12 (Wiley Plus) assignments. 2 assignments per week will open on Wednesdays at 10:00 AM and close next Tuesday at 11:59 PM

[2] 6 labs in total beginning on Thursday, June 29

[3] 10 group activities (10%) held during every session beginning Thursday, June 29; TopHat questions (5%) asked during lectures.

[4] In-person exam on July 19 from 8:00 AM to 10:00 AM.

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 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 3 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 or in-person 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 midterm

If a student misses the midterm, they must fill out the Missed Midterm form on D2L and submit it to the appropriate dropbox **within 2 days of the missed midterm**. If the request is approved, the weight of the missed midterm will be shifted to the final exam. A missed midterm that does not have an approved accommodation from the course coordinator will result in a zero for the midterm.

Missed labs

There is no make-up or deadline extension for the missed labs; instead, the best 5 grades of the labs out of 6 will

be counted toward your final grade accommodating for missing one lab.

Missed group activities

There is no make-up or deadline extension for the missed group activities; instead, the best 8 grades of the activity sheets out of 10 will be counted toward your final grade accommodating for missing two group activities.

Missed WileyPlus assignments

The deadline for the online assignments will not be extended; instead, the best 10 grades of the assignments out of 12 will be counted toward the final grade accommodating for missing two assignments.

Missed Top Hat

There will be no make-up for a missed Top Hat; instead, the final grade for Top Hat is adjusted at the end of the term in order to accommodate for any Top Hat questions you might occasionally miss due to different circumstances. Each grade is divided by 0.8 and capped at 100%. For example, if your grade is 85%, your adjusted grade will be 100% (85%/0.8= 106%, capped at 100%). If your final grade is 76%, your adjusted final grade will be 95% (76%/0.8=95%).

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

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

6. **Course Materials:**

   Recommended Textbook(s):

   David Halliday, Robert Resnick, Jearl Walker, *Fundamentals of Physics, 12th Edition*: Wiley.

   - WileyPlus license for online assignments (information about the registration is on D2L)
   - A TopHat license (free for UofC students at tophat.com) and a responsive device such as a phone, laptop or tablet.
   - Recorded lectures will be posted on D2L (free of charge)

   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.

   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 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.

FORMATIVE ASSESSMENTS

The following course components are designed to help you and the instructor assess your comprehension, learning needs, and academic progress during the course.

LABATORIALS(18%)

Labatorials begin on Thursday, June 29, 2023 (see course schedule table below). Please note that lab groups will be formed during the first lab session. 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. TA offers assistance and guidance and checks students understanding periodically throughout the session. Labatorials typically involve a class demonstration, computer simulation, 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.

TOP HAT (5%)

As a vehicle to encourage class participation and student interaction, as well as to provide instructors with rapid, real-time feedback, the Top Hat student response system will be employed. Detailed instructions on how to register for an account will be provided via D2L Each lecture session will have its own Top Hat course name, which will be given to you by your instructor. The Top Hat questions are graded for 50% participation and 50% correctness.

Make sure you are using your **correct UCID** and your **ucalgary.ca email address** for your Top Hat enrollment, otherwise the grade for Top Hat will not be counted towards your final.

IN-CLASS ACTIVITIES (10%)

There will be 10 in-class activities that will consist of questions posed by your instructor based on applications of the course material from the recorded lectures (see course schedule table below). These questions and problems are to be worked on in groups, while the instructor and TA are available to answer questions and assess understanding, Attendance at and participation during these activities is mandatory to receive credit for them.

WILEYPLUS ONLINE ASSIGNMENTS (12%)

12 weekly assignments on WileyPlus will open on Wednesdays at 10:00 am. There will be multiple attempts per question and no marks will be deducted for multiple attempts. **No deadline extensions are granted on assignments**. Detailed instructions on how to purchase a code and register will be provided via D2L. Make sure you are using your **correct UCID** and your **ucalgary.ca email address** for your WileyPlus Enrollment, otherwise

the grades for your assignments will not be counted toward your final.

Assignment #	Available to Students (10:00 am)	Due Date (11:59 pm)
1 and 2	Wed 28-June-23	Tue 4-July-23
3 and 4	Wed 5-July-23	Tue 11-July-23
5 and 6	Wed 12-July-23	Tue 18-July-23
7 and 8	Wed 19-July-23	Tue 25-July-23
9 and 10	Wed 26-July-23	Tue 1-Aug-23
11 and 12	Wed 2-Aug-23	Tue 8-Aug-23

Week Date	Textbook Ref.	Asynchronous Lecture/Topics	Synchronous Lecture Topics/Activities/Labs
June 26- June 30	21.1- 21.3- 22.1- 22.2- 22.3 22.4- 22.5- 22.6	Lec 1 Charges, and Polarization- Lec 2 Coulomb's Law & Vector Review- Lec 3 Coulomb's Law in 2D & Superposition Lec 4 Symmetry, Electric Force from the line of charge- Lec 5 Limiting cases & Electric Fields- Lec 6 Electric Fields and Forces	Tue Lec: Intro to the course, review the main concepts of session 1 recorded lectures Thu Lec: review the main concepts of session 2 recorded lectures, TopHat 1, activity 1 Lab #1: Electric Charges and Forces Between Them
July 4- July 7	22.7- 23.1- 23.2- 23.4 23.5- 23.6- 24.1- 24.3- 24.4	Lec 7 Electric Forces & Torque on a dipole- Lec 8 Flux; Gauss' Law - Calculating Flux- Lec 9 Gauss' Law - spherical symmetry, cylindrical symmetry Lec 10 Superposition- Lec 11 Electric potential energy- Lec 12 Electric potential	Tue Lec: review the main concepts of session 3 recorded lectures, TopHat 2, activity 2 Thu Lec: review the main concepts of session 4 recorded lectures, TopHat 3, activity 3 Lab #2 Electric Fields of Charge Configurations
July 10- July 14	24.5- 24.7- 24.2- 24.6- 23.3 24.8- 25.1- 25.2- 25.4- 25.5	Lec 13 Calculation of the potential for insulators- Lec 14 Equipotential surfaces, potential gradients- Lec 15 Charges on conductors Lec 16 Charges on conductors continued, Intro to capacitance- Lec 17 Gauss' Law to get capacitance, energy storage- Lec 18 Dielectrics	Tue Lec: review the main concepts of session 5 recorded lectures, TopHat 4, activity 4 Thu Lec: review the main concepts of session 6 recorded lectures, TopHat 5, activity 5 Lab #3 Capacitors
July 17- July 21	26.1- 26.2- 26.3- 26.4- 27.4 28.1- 28.2- 28.4- 28.5- 28.3- 28.6	Lec 19 Electric current, current density- Lec 20 resistance, resistivity, molecular view of Ohm's Law- Lec 21 RC circuits Lec 22 Magnetic fields, motion of charged particles in magnetic fields- Lec 23 Cyclotrons and mass spectrometer- Lec 24 Magnetic force on a current-carrying conductor, Hall effect	Tue Lec: review the main concepts of session 7 recorded lectures, TopHat 6, activity 6 Thu Lec: review the main concepts of session 8 recorded lectures, TopHat 7, activity 7 No Labs Midterm: Wednesday, July 19
July 24- July 28	28.7- 28.8- 29.1- 29.2-29.5 29.3- 29.4	Lec 25 Force and torque on a current loop (plus magnetic dipole)- Lec 26 Magnetic field of a current element- Lec 27 Biot-Savart Law: circular arc, finite line of current Lec 28 Ampere's Law- Lec 29 Coaxial cable, superposition- Lec 30 Solenoids and toroids	Tue Lec: review the main concepts of session 9 recorded lectures, TopHat 8, activity 8 Lab# 4 Electron Charge to Mass Ratio Thu Lec: review the main concepts of session 10 recorded lectures, TopHat 9, activity 9 Lab #5: Electric Resistivity of Play-Doh
July 31- Aug 4	30.1- 30.2- 30.3 30.4- 30.5- 30.7- 30.8- 30.6	Lec 31 Faraday's Law & Lenz's Law- Lec 32 Examples and applications (motional EMF)- Lec 33 Examples and applications (motional EMF) Lec 34 Inductors, self-inductance- Lec 35 Magnetic field energy- Lec 36 RL circuits	Tue Lec: review the main concepts of session 11 recorded lectures, TopHat 10, activity 10 Thu Lec: review the main concepts of session 12 recorded lectures, TopHat 11, Final Exam Review part 1 Lab 6 # Magnetic Field in a Slinky
Aug 8	N/A	No recorded lectures	Tue Lec: Final Exam Review Part 2

Course Incomes:

Students coming into PHYS 259 should be able to:

- Demonstrate ability to solve quadratic formula
- Using trigonometry and basic geometry to solve problems
- Employ basic algebra manipulations
- Perform derivatives and integrals

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;
- Carry out calculations symbolically in terms of physical variables;
- Carry out calculations numerically, using appropriate values and their units;
- Obtain experimental data and relate them to predicted physical laws governing electricity and magnetism;
- and communicate and collaborate effectively within team environments.

Electronically Approved - Jun 22 2023 16:56

Department Approval