UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS and ASTRONOMY
COURSE OUTLINE

1. **Course:** PHYS 323 Optics & Electromagnetism FALL 2017

Instructors:

Dr. Phil Langill (Course Coordinator) | SA 101B | (403) 220.5402 | pplangil@ucalgary.ca | Office Hours: TBA
Lecture Section: LEC 01 | MWF 09:00-09:50 | AD 142

Laurence Lines | ES 570B | (403) 220.2796 | lrlines@ucalgary.ca | Office Hours: TBA
Lecture Section: LEC 02 | MWF 12:00-12:50 | AD 140

Course Website: d2l.ucalgary.ca

Departmental Office: SB 605, 403.220.5385, phasugrd@ucalgary.ca

2. **Prerequisites:** Physics 211 or 221 or 227, and 223; Applied Mathematics 217 or Mathematics 249 or 251 or 265 or 275. Note: The Faculty of Science policy on pre- and co-requisite checking is outlined in the 2015-2016 Calendar. A student may not register in a course unless a grade at least" C-" has been obtained in each pre-requisite course; it is the responsibility of students to ensure that their registrations are in order. See http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html for details.

3. **Grading:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining an overall percentage grade in the course, the following weights will be used;

Assignments (12): 24%
Labs (5): 20%
TopHat (in class response system): 2%
Midterm Exam: 24% (Oct. 16th)
Final Exam: 30% (To be scheduled by the Registrar's Office)

NOTE: Students who attain an overall weighted average grade on the midterm and final exams of *less* than 40% should not expect to receive a course letter grade above a D.
The conversion from overall course percentage grade to course letter grade follows this mapping:

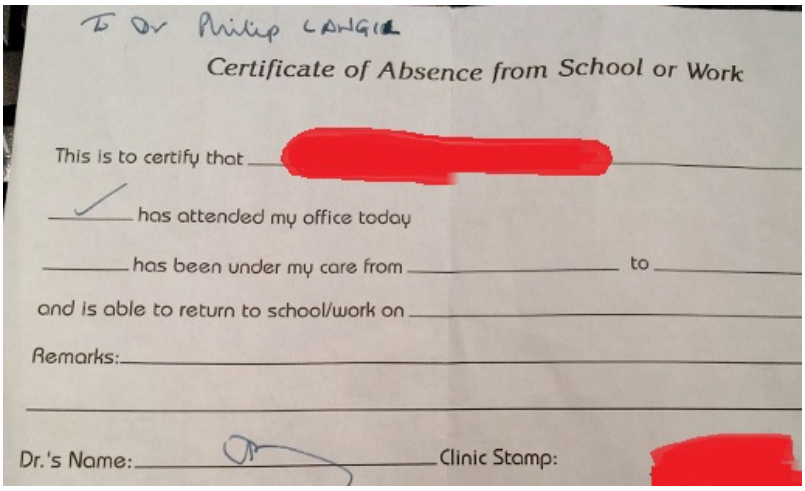
> 92 %	A +	≥ 75 %	B +	≥ 60 %	C +	≥ 45 %	D +
≥ 85 %	A	≥ 70 %	B	≥ 55 %	C	≥ 40 %	D
≥ 80 %	A -	≥ 65 %	B -	≥ 50 %	C -	< 40 %	F

4. **Missed Components of Term Work:** 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 himself/herself with these regulations. See also Section E.6 of the University Calendar.

Students who miss a lab or assignment because of ill health, or for other valid reasons, will most often 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* (physician, counselor, etc.). Student's final marks for their labs (assignments) will be calculated by averaging the revised number of labs (assignments) which are subsequently required.

In the case of a missed exam due to illness, students must notify the Course Coordinator 24 hours before the exam, *at the latest*. Should the claim of illness be substantiated, ***ONE*** written make-up exam will be arranged. Should that written make-up exam also be missed for legitimate reasons, an oral make-up exam will be administered.

The Doctor's notes below are examples of 'sick notes' that will ***NOT BE ACCEPTED*** as they do not substantiate claims of illness.


To Dr Philip LANGILL

Certificate of Absence from School or Work

This is to certify that [redacted]

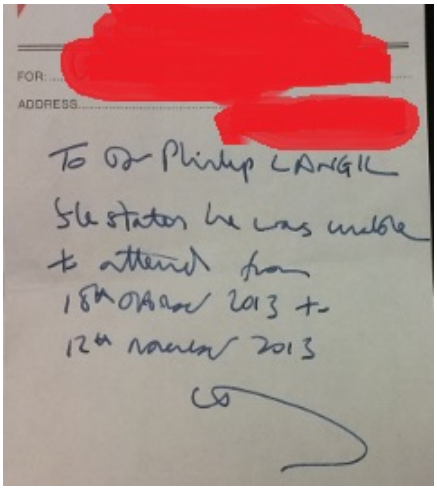
✓ has attended my office today

_____ has been under my care from _____ to _____

and is able to return to school/work on _____

Remarks: _____

Dr.'s Name: _____ Clinic Stamp: [redacted]


FOR: [redacted]

ADDRESS

To Dr Philip LANGILL

She states he was unable to attend from 18th October 2013 to 12th November 2013

5. **Scheduled out-of-class activities:** Dates and times of class activities held outside of class hours:

   Midterm Exam will be held on Monday Oct. 16th, 18:00 – 20:30 in SB 103.

   Students are expected to make every effort to attend this exam. If you have a legitimate conflict such as a lecture or lab in another course, you must inform the course coordinator at least *2 weeks* prior to the exam so that alternative arrangements may be made for you.

6. **Course Materials:** ***"Physics for Scientists and Engineers" 3rd Ed.*** R. Knight, Pearson-Addison-Wesley 2016

7. **Examination Policy:** Rules pertaining to the use of calculators, and other devices, during exams will be discussed in lecture. Students should also read the Calendar, Section G, on Examinations.

8. **Course fees**: There are no mandatory or optional additional fees required to take Phys 323.

9. **Writing across the curriculum**: In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also Section E.2 of the University Calendar.

10. **Human studies statement**: Students in this course are not required to participate as subjects or researchers. See also Section E.5 of the University Calendar.

11. OTHER IMPORTANT INFORMATION FOR STUDENTS:

(a) **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.

(b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

(c) **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 http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.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, preferably in writing, to the Associate Head of the Department of Physics and Astronomy, Dr. David Feder, by email (dfeder@ucalgary.ca) or by phone (403.220.3638).

(d) **Safewalk:** Campus Security will escort individuals day or night (http://www.ucalgary.ca/security/safewalk/). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, 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 also http://www.ucalgary.ca/secretariat/privacy.

(f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucagary.ca.
SU Faculty Rep: Phone: 220-3913
Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca; http://ucalgary.ca/provost/students/ombuds

(g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, smartphones or other devices connectable to the Internet are not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

12. OTHER COURSE RELATED INFORMATION:

(a) **Course Description**

Static electric fields due to charge distributions. Static magnetic fields due to current distributions. Dynamic electric and magnetic fields and the generation of electromagnetic waves. *Physical optics*: Interference and diffraction. *Geometrical optics*: Thin lenses and curved mirrors and optical instruments.

(b) **Course Learning Outcomes**

Students in PHYS 323 will be immersed in an environment including lectures, labs, peer learning situations and casual office hour chats, which encourages critical and analytic thinking. Students will come out of PHYS 323 with a greater appreciation of the mathematical tools used to describe the behavior of the world, and a deeper understanding of the fundamental workings of the field nature of the universe. Laboratory skills will also be stressed in this course.

(c) Course Learning Incomes

This course is the natural follow-up to PHYS 223. Students should be ready to take the knowledge of electric and magnetic fields learned there, to a higher level whereby they together constitute electromagnetic waves. Students will also build on the mathematical skills developed in PHYS 223, and/or other introductory physics and math courses.

(d) Assignments, 'Clickers', and your grades:

- **TopHat Participation:** As a vehicle to encourage class participation and student interaction as well as providing instructors with rapid, in-class feedback of student understanding, the TopHat System will be employed. This is the same response system used in the Winter 2017 semester for Physics 223. A demonstration/test 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.**

This is an opportunity to answer questions in class – anonymously. The type and number of response questions you will encounter over the semester is at the sole discretion of your instructor. Participate and you can earn up to 2% toward your overall course grade. If students make any attempt to answer a question they get 1 mark, and if they get the answer correct they get 1 more mark. Such questions are worth 2 marks. Some of the questions asked will not have a specific correct answer and are worth 1 mark. The TopHat grade a student will earn will be the total marks they accumulated over the semester divided by the maximum mark obtainable, times 2%. Clicker stats will be officially accumulated starting Friday Sept. 25th.

- **Mastering Physics Assignments:** Online assignments will be employed in this course, just as was done in PHYS 223. Assignments will be mostly made available on Fridays. They are mostly due on Sunday evenings at 11:59PM. The exact schedule of due dates is in the table below. To access the assignments go to https://www.masteringphysics.com/site/login.html

Your MP course is named Phys323-Fall2017 with corresponding course ID EMWAVES99090. As with PHYS 223 in W17 there is a free and paid version of this online tool. Students who go with the paid version also have access the course eTextbook. Students should check whether their subscription from last semester is still valid. THE document with all the details about registering for MP is found on the D2L PHYS 323 course.

- **Monitoring your Course Grades:** As your term work items accumulate (labs, assignments and exams), the marks for students in PHYS 323 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.

(e) Syllabus and Lab Schedule

- **Lab format**: Labs in PHYS 323 are NOT of the labatorial format students did in Phys211/221/223. Your labs will involve experimental set-up, measurement, and analysis including quantifiable uncertainties and their justification. This will give students an appreciation for the fundamental connection between theory and observation – central to scientific investigation. The lab schedule is in the table on the next page.

Physics 323 Tentative Schedule – Fall 2017

The week of Monday…	Topics (assignment # due date)	Textbook readings	LAB
Sept 11th	Coulomb's Law and Electric field of point charges. E of dipoles. (Assign#1 due on the 17th)	25.4 - 25.5 26.1 - 26.2	----
Sept 18th	E of continuous charge distributions. Dipoles in electric fields. (Assign#2 due on the 24th)	26.3 – 26.5 26.7	Measurement Uncertainties
Sept 25th	Electric flux and Gauss's Law (Assign #3 on the 1ST)	27.1 – 27.6	----
Oct 2nd	B produced by moving charges and current. Magnetic Dipoles. Ampere's Law (#4 on the 8th)	32.3 – 32.6	Wave Propagation
Oct 9th	Magnetic Flux and Faraday's Law Induced E and intro to Electromagnetic Waves (#5 on the 15th) *** Thanksgiving on Monday 9th – no lecture ***	33.3, 33.5 33.6	----
Oct 16th	Displacement Current, Maxwell's Eqn's, EM waves and their properties, Malus's Law (#6 on the 22ND) *** Midterm Exam – SB103 – Monday Oct. 16th ***	34.2 – 34.7	----
Oct 23rd	Light & Sound, power and intensity. (#7 on the 29th)	20.5, 20.6	----
Oct 30th	Doppler Effect, Interference in 1D, Thin film interference. (#8 on the 5th)	20.7, 21.5, 21.6	Linear Polarization
Nov 6th	Interference and Diffraction of light. *** Reading Days – Nov. 10th and Nov. 13th - no lectures ***	22.1 – 22.5	----
Nov 13th	Interferometers, Reflection & Refraction, Dispersion (#9 on the 19th)	22.6, 23.2, 23.5	----
Nov 20th	Image Formation by Refraction. Thin Lenses. (#10 on the 26th)	23.4, 23.6, 23.7	Concave Mirrors
Nov 27th	Image formation by Spherical Mirrors. Lenses in combination. Cameras and the eye. (#11 on the 3RD)	23.8, 24.1 – 24.3	----
Dec 4th	Microscopes, telescopes and resolution. (#12 on the 8th) *** last lecture Dec. 8th ***	24.4 – 24.5	Thin Lenses & Optical Instruments
	Final Exam Period: Dec. 11th to 21st		

Department Approval_____Date_____

Associate Dean Approval_____Date_____