

**PHYSICS 1008**

Information and Course Outline, Summer 2020

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Hours: Online MW 2:35 to 5:25 pm

Office Hours: Online Friday 6:05 to 8:05 pm

**Laboratory:****cuLearn:** Crosslist PHYS1008A1:A2:A3 [21389:21390:21647] University Physics II (LAB) Summer 2020**Supervisor:** Ms. Tamara Rozina**Office:** Herzberg 3374**Email:** [Tamara.Rozina@carleton.ca](mailto:Tamara.Rozina@carleton.ca)**Times:**

	Monday	Tuesday	Wednesday	Thursday
2:35 – 5:25 pm	A1		A3	A2

**1. Course Organization****Calendar entry – PHYS 1008 Elementary University Physics II**

Electricity and magnetism, DC and AC circuits, wave motion and light. Elements of modern physics. Applications chosen in part from the life sciences.

Precludes additional credit for BIT 1003 (no longer offered), BIT 1007, BIT 1204, PHYS 1002, PHYS 1004.

Prerequisite(s): PHYS 1001 or PHYS 1003 or PHYS 1007.

Lectures three hours a week, laboratory or tutorial three hours per week.

**Prerequisites – PHYS 1008**

Students in this course must have PHYS 1007 or equivalent, and are expected to have completed MATH 0107 or MATH 1007 or their equivalent. Otherwise you must obtain permission of the Physics Department. *If you have failed Physics 1007 in the 2019 Fall term, you must leave the course.*

**Required Materials**

1. **Textbook:** *PHYSICS*, Giambattista, Richardson & Richardson, McGraw Hill, 2nd edition (2010) or 3rd edition (2016). Available at the Campus Bookstore. This is the

same textbook as for Physics 1007. Try to find a second hand copy if you do not have the book already.

2. A scientific *calculator*.

### Learning objectives

Upon completion of this course,

1. at an elementary university level, students will be able to recall and apply basic knowledge of electricity and magnetism, optics, and modern physics.

2. students will have developed basic problem solving skills using the tools of physics and algebra, regarding electricity and magnetism, optics, and modern physics.

students will be introduced to a range of mathematical and computational techniques for analyzing physical measurements, plotting methods and the concept of linearization, interpretation of results with the concepts of random and systematic uncertainties, uncertainty analysis and statistics

4. students will have developed basic written communication skills for reporting lab work and their analysis of solved problems.

5. students will have a sense of the history of the field, having been introduced to the leading pioneers including Coulomb, Ampere, Faraday, Maxwell, and Einstein.

### Advice to the student

This course is primarily intended for people not intending to pursue dedicated studies in physics. If your plan is to take PHYS courses in year 2 or beyond, please speak to your instructor or the Physics Department undergraduate advisor.

Significant practice in problem solving, algebra and scientific computing will be exercised throughout the term but knowledge of meaning and the concepts they reflect will be part of the objectives of the lectures and therefore are the student's responsibility to use in assignments and tests accordingly.

### 2. Laboratories

Information about the labs can be found on the LAB cuLearn page: *Crosslist PHYS1008A1:A2:A3 [21389:21390:21647] University Physics II (LAB) Summer 2020*. All the sessions will be held via a BigBlueButton (BBB) session available on that page.

Information on using BBB can be found at:

<https://carleton.ca/culearnsupport/students/bigbluebutton/>

It is imperative that all students attend the first lab. You may attend only the section that you are registered in. All changes (exemptions, etc.) must be arranged with the Lab Supervisor, Ms. Tamara Rozina at the start of term. Students who might be exempt from the Lab (if they are repeating the course, for example) must contact the Lab Supervisor. You are not automatically given a lab exemption - you must apply for it. Lab exemptions will be considered on a case-by-case basis.

The grade for every lab will be based on a **quiz (20%)** and a **report (80%)**. All lab work (reports and quizzes) count towards your total lab grade for the course. **No grade will be dropped.**

All lab work must be completed by the appointed time: **96 hours (4 days)\*\*\*** after the lab session for reports and **24 hours** after the lab session for the quizzes. Exceptions to this will be announced (see below). The penalties for late submission of the lab report is **30% of the grade**.

If you miss a lab, contact Ms. Rozina **immediately**. See also section 4, next page.

### Lab Schedule

Lab #	Title	Deadline for report	Weight (%)	Week of
1	DC Circuits	96 hours after lab	10	July 6, 2020
2	Oscilloscope	96 hours after lab	25	July 13, 2020
3	Diffraction Grating	96 hours after lab	25	July 20, 2020
4	Ray Optics	96 hours after lab	25	July 27, 2020
5	Photoelectric Effect	End of lab session	15	August 3, 2020 for A2 & A3 August 10, 2020 for A1

\*\*\* Except Lab 5

## 3 Tests and Assignments

### 3.1.1 CuLearn Weekly Home Work Assignments (HWs)

There will be 2 or 3 weekly online HW assignments (one only for the first week) that will be used as part of the overall term marks. These will be administered through CuLearn.

The assignments will be based on material studied during the lectures during that week. The assignments will become available at the beginning of the week for the students to attempt. You will have 3 attempts during the week before the assignment closes. See the time table for the lectures and HWs at the end of this document.

Be vigilant and be sure to always check the due dates on the list. There will be an assignment scheduled on a weekly basis.

If there is any discrepancy between the marks posted in CuLearn gradebook and your calculated values notify the instructor immediately.

### Numerical Answers

In answering the assignment calculation questions enter the answer when appropriate in **scientific notation with three significant figures e.g. 1.60E-19 for  $1.6 \times 10^{-19}$** . You are allowed a 5% variance between your answer and the one calculated within cuLearn to account for round errors, and so on. If you do not your answer with three significant figures your answer will be outside of this 5% threshold and will therefore be marked as incorrect. Answers of this sort will not be eligible for re-assessment by the professor.

Be sure always to take careful note of the units for your answer, typically it is expected that the answer will follow SI units (m, s, J, etc.) however there are occasions in with non-standard units will be required for the specific question. Generally, these instances will be noted in the question itself, e.g. "Express your answer in km". Also, **units are not to be entered** with the numerical answer for these assignments!

### Scientific Calculators

It is highly recommended that you use and understand the functionality of a reliable scientific

calculator for all calculations on assignments and tests. In particular, it is good practice to fully understand how to use the scientific notation functionality that all scientific calculators will have available. This will save a great deal of time in all your calculations and greatly reduce mistakes. There are a number of additional functions (such as tabbed results) which can be beneficial in performing calculations.

### 3.1.2 Pre-Class Quizzes (RQs)

In addition to the weekly online assignments through CuLearn, there will be a pre-class quiz due before each lecture. See the time table for the RQs along with lectures and HWs at the end of this document. These quizzes are to insure that you have read the designated chapter(s) prior to taking the class. There will only be one attempt at these quizzes and all quizzes will count toward the final grade. The questions will be conceptually based and so in general no calculations will be needed to complete any individual question.

### 3.1.1 Final Examination

Final examination will be scheduled during the regular examination period, at the end of the term. The final exam will be a cumulative covering all sections and chapters studied during the lectures. The final exam format will be online (HW like) exam with one attempt during a specific given time (2 or 3 hours).

The exam will not include material from the laboratory manual.

## 4 The Marking Scheme

The marking scheme will be as follows:

Online Assignments:	25%
Pre-Class Quizzes	15%
<u>Final Exam:</u>	<u>35%</u>
<b>Theory section</b>	<b>75%</b>
<b><u>Laboratory:</u></b>	<b><u>25%</u></b>
Total	100%

### 4.1 Passing Conditions

In order to pass the course, students must attempt the quiz and hand in a report for **all labs**. Missing

labs must be accounted for by making alternate arrangements with the Lab Supervisor. In addition, you must have

**4.1.1** an overall mark must be *greater than 50%*, AND

**4.1.2** must achieve *40% or above* on *BOTH* the Theory ( $\geq 26/65$ ) AND the Lab ( $\geq 14/35$ ) components of the course.

(NOTE: Theory includes Assignments, PCQ and Final Exam)

Students with an overall course mark above 50%, but who achieve between 40% and 49% on either Theory or Lab Experiments will be given a grade of D-, no matter how good their overall mark is.

### CuLearn

This course makes extensive use of CuLearn to deliver online assignments, course material and information, suggested problem sets, and for tracking your grades. Each of the two lecture sections has a CuLearn site with links to assignments, problem sets, lecture notes and other information. It is your responsibility to keep checking the CuLearn site for current information. There is a separate CuLearn site for the Labs.

### Email

Every student must use their Carleton cmail (or Connect) account in any communication to university academic staff. Emails sent from external e-mail accounts will **not** be answered. *It is important to monitor the space available in your account. If a message cannot be delivered due to an overflow, then you might miss something important.*

### Academic Honesty

The attention of all students is drawn to the section 12 of the Academic Regulations of the University:

[calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/academicintegrity/](http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/academicintegrity/)

Any attempt to plagiarize the work of another is a serious academic offence. A report will automatically be sent to the Dean of Science, for possible disciplinary action.

### Intellectual property

Classroom teaching and learning activities, including lectures, discussions, presentations, etc, by both instructors and students are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, pdf's, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s).

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

### Deferred Exams

Deferred Exams are generally only granted to students who cannot take the regularly scheduled final exam due to illness. Students must apply for a deferred exam to the Registrar's Office within three working days of the date of the exam. For the 2020 winter term, deferred exams will be held

May 15-27. In Phys 1008 and Bit 1204, a Deferred Exam replaces only the Final Exam portion of the marks, which is 30% of the course. Therefore students who earn less than about 25 out of the possible 70 marks for the term, including the Lab, need to be aware that it is pointless to attempt a deferred exam. Also keep in mind that the Lab must be passed separately. For more information please see: <http://carleton.ca/registrar/special-requests/deferral/>

### For those repeating the course

*If the lab component of the course has been successfully completed, then credit for this may be carried forward, and only the theory sections of the course need be repeated. This means that the Lab mark from your previous registration for the course will be used in calculating your final grade for this term. Whether or not you qualify for a lab exemption is decided on a case-by-case basis by the Lab Supervisor. **Students must confirm their eligibility with the Lab Supervisor, Ms. Tamara Rozina, no later than Friday, July 3, 2020. This is not automatically granted.***

Students repeating the course, for whatever reason, are *not excused from the cuLearn assignments.*

## 5. Additional Information

### Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

***Pregnancy obligation:*** write to your professor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [carleton.ca/equity/](http://carleton.ca/equity/) and see the [student guide](#) .

***Religious obligation:*** write to your professor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [carleton.ca/equity/](http://carleton.ca/equity/) and see the [student guide](#) .

***Students with disabilities:*** The **Paul Menton Centre** for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact the PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send your instructor your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled evaluation requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your professor to ensure accommodation arrangements are made. Requests for accommodation for the April exam must be made by March 13 as per [carleton.ca/registrar/registration/dates-and-deadlines/](http://carleton.ca/registrar/registration/dates-and-deadlines/) .

***Survivors of sexual violence:*** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual

*Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit [carleton.ca/sexual-violence-support](http://carleton.ca/sexual-violence-support).*

***Accommodations for student activities:** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see [the policy](#).*

*You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at [carleton.ca/equity/](http://carleton.ca/equity/).*

## **6. Course Schedule**

**Note:** Term begins Thursday July 2nd and ends Friday August 14th. The University is closed on Monday August 3rd (civic holiday), and the examination period is Monday August 17 through Saturday August 23, inclusive.

For all important dates in the academic year please see [calendar.carleton.ca/academicyear/](http://calendar.carleton.ca/academicyear/).

Lectures, RQs and HWs tentative time table (subject to change by the instructor).

Lecture	Topic(s)
Jul 06	<p>Ch 16 - Electric Charge, Conductors and Insulators, Coulomb's Law, Electric Field, Motion of Charge in <math>\mathbf{E}</math> field, Conductors in electrostatic equilibrium and Gauss' Law for electric fields.</p> <p>RQ Ch16 is due.</p>
Jul 08	<p>Ch 17 – Potential Energy, Potential, Field and Potential, Conservation of Energy; moving charges, Capacitors, Dielectrics and Energy in a Capacitor.</p> <p>RQ Ch17 is due.</p>
Jul 13	<p>Ch 18 – Current, EMF &amp; Circuits, Resistance &amp; Resistivity, Kirchoff's Rules, Series and Parallel Circuits, Power and Energy in Circuits, RC Circuits and Electric Safety.</p> <p>RQ Ch18 is due.</p> <p>HW Ch 16 and HW Ch17 are due.</p>
Jul 15	<p>Ch 19 – Magnetic Fields, Magnetic Force on a point charge, Charged particle moving perp to a uniform <math>\mathbf{B}</math> field, Charged particle in a uniform magnetic field, Charged particle in crossed <math>\mathbf{E}</math> and <math>\mathbf{B}</math> fields and Magnetic field due to an electric. Current.</p> <p>RQ Ch 19 is due.</p>
Jul 20	<p>Ch 20 - Faraday's Law, Lenz's Law and Inductance.</p> <p>Ch 21 - AC currents and voltages, with resistors, Capacitors in AC and Inductors in AC.</p> <p>RQ Ch 20 is due.</p> <p>HW Ch 18 and HW Ch19 are due.</p>
Jul 22	<p>Ch 22 - EM spectrum, Speed of EM waves, Travelling EM waves in a vacuum, Intensity (partial) and Polarization</p> <p>Ch 23 - Wavefronts &amp; Rays and Reflection.</p> <p>RQ Ch(s) 22-23 is due.</p>
Jul 27	<p>Ch 23 - Refraction, TIR and Thin lenses.</p> <p>Ch 24 – Lenses in combination, The Human Eye, Simple magnifier and Compound microscopes (qualitative only).</p> <p>RQ Ch(s) 23-24 is due.</p> <p>HW Ch(s) 20-21 and HW Ch 23 are due.</p>

Jul 29	<p>Ch 25- Constructive and destructive interference, Young's Double Slit, and Resolution of optical instruments.</p> <p>Ch 27 - Quantization, Blackbody Radiation, The Photoelectric Effect and X-Ray Production.</p> <p>RQ Ch(s) 25-27 is due.</p>
Jul 31	<p>Ch 27- The Bohr Model of the Hydrogen Atom and Atomic Energy Levels.</p> <p>Ch 28 - Wave particle duality, Matter waves (de Broglie), Electron microscope, Uncertainty Principle and Wave functions: confined particle.</p> <p>RQ Ch(s) 27-28 is due.</p>
Aug 03	<b>Civic Holiday</b>
Aug 05	<p>Ch 28 – Exclusion Principle, Lasers and Tunnelling</p> <p>Ch 29 - Nuclear structure, Binding Energy, Radioactivity and Decay rates and half life.</p> <p>RQ Ch(s) 28-29 is due.</p> <p>HW Ch(s) 23-24 and HW Ch 25 are due.</p>
Aug 10	<p>Ch 29 – Biological effects of ionizing radiation, Nuclear Fission and Nuclear Fusion.</p> <p>Ch 30 - Fundamental Particles, Fundamental Interactions and Particle Accelerators.</p> <p>RQ Ch(s) 29-30 is due.</p>
Aug 12	<p>Catch-up and course review</p> <p>HW Ch 27 and HW Ch 28.</p> <p><b>HW Ch 29 and HW Ch 30 is due on Aug 19.</b></p>