PHYSICS 1008
Information and Course Outline, Summer 2021

Carleton
UNIVERSITY

Instructor: Dr. Mustafa Bahran

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Hours: Online MW 6:05 to 8:55 pm

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

Laboratory:

Brightspace : Merge PHYS1008A1:PHYS1008A2:PHYS1008A3 [21411:21412:21413] University Physics II (Lab) Summer 2021

Supervisor: Ms. Tamara Rozina

Office: Herzberg 3374
Email: Tamara.Rozina@carleton.ca
Times:

	Monday	**Tuesday**	**Wednesday**	**Thursday**
8:35 – 11:25 am		A1		
2:35 – 5:25 pm				A2

For online support page regarding Bright space please go to:

https://carleton.ca/brightspace/instructors/

For Carleton Academic year go to:

https://calendar.carleton.ca/academicyear/

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 secondhand copy if you do not have the book already. An online version of the book (e-book) is offered by the published=r at: **https://connect.mheducation.com/connect**

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.

3. 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.

Lecture attendance

Lectures are online via Brightspace course page using the BBB. Although, **most** lectures will be recorded and recordings will be made available at most next day to delivery, it is highly

recommended that students attend every lecture (online) throughout the term, and it is therefore expected that students will make every effort to do so. Lectures will contain additional information, hints and examples that may not be available on the lecture slides, in the textbook or in general information provided via the course Brightspace website. If a student misses a lecture, it is his or her responsibility to determine what information was presented. That is to say: **students are responsible for everything the professor delivers during lectures as well as materials in relevant chapters of the book and on Brightspace. That is in addition to the lab requirements.**

It is also expected that students will also read relevant sections in the textbook (or the equivalent) that match those presented during lectures. Due to the time constraints, it is not always possible to give the most complete description of all phenomena in the lecture. Supplemental material is found in the textbook and is therefore subject to appear on tests and assignments.

2. Laboratories

Information about the labs can be found on the LAB Brightspace page: Merge PHYS1008A1:PHYS1008A2:PHYS1008A3 [21411:21412:21413] University Physics II (Lab).

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/brightspace/students/participating-in-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 no later than **July 9, 2021**. Lab exemptions will be considered on a case-by-case basis at the discretion of the Lab Supervisor.

The grade for every lab will be based on a **quiz (10%)** and a **report (90%)**. 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: **1 week** after the lab session for reports **for Lab 1-4** and **24 hours** after the lab session **for Lab 5**. All lab quizzes are due **24 hours** after the lab session. The penalties for late submission of the lab report is **30% of the grade**.

The last day to submit any outstanding lab reports is **4pm (EDT) on Friday, August 6, 2021**. **No late work will be accepted past this deadline.**

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	1 week	10	July 5, 2021
2	Properties of Charge Carriers	1 week	25	July 12, 2021

3	Properties of Light	1 week	25	July 19, 2021
4	Simple Lenses	1 week	25	July 26, 2021
5	Photoelectric Effect	24 hours after lab session	15	August 2, 2021

Additional information regarding the structure of the laboratory component of the course can be found in the Lab Policy and other supporting documentation on the LAB Brightspace page.

3   Tests and Assignments

3.1.1 Brightspace Weekly Home Work Assignments (HWs)

There will be 2 or 3 weekly online HW assignments that will be used as part of the overall term marks. These will be administered through Brightspace.

The assignments will be based on material studied during the lectures. The assignments will become available at the beginning of the week for the students to attempt. You will have 2 attempts during the week before the assignment closes. See the timetable 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 Brightspace grade 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 x 10^{-19}**. You are allowed a 5% variance between your answer and the one calculated within Brightspace 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 Reading Quizzes (RQs)

In addition to the weekly online assignments through Brightspace, there will be a pre-class reading quiz due before each lecture. See the timetable for the RQs along with lectures and HWs at the end of this document. These quizzes are to ensure 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 (time allocated will be 45 to 60 minutes. The questions will be conceptually based in general and sometimes calculations will be needed to complete an individual question. The first RQ is particularly harder to test if you are ready for the course.

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 (3 hours).

The exam will not include material from the laboratory manual.

Please note that tests and examinations in this course will use a remote proctoring service provided by Scheduling and Examination Services. You can find more information at https://carleton.ca/ses/e-proctoring/.

Students must adhere to the rules and requirements of the e-proctoring process as spelled out by Carleton and the course instructor prior to the exam date.

4   The Marking Scheme

The marking scheme will be as follows:

Online Assignments:	25%
Pre-Class Quizzes	15%
Final Exam:	25%
Theory section	65%
Laboratory:	35%
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 HWs, RQs 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.

Brightspace

This course makes extensive use of Brightspace to deliver online assignments, course material and information, suggested problem sets, and for tracking your grades. The lecture section has a Brightspace site with links to assignments, problem sets, lecture notes and other information. It is your responsibility to keep checking the Brightspace site for current information. There is a separate Brightspace 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*. **I have the habit of answering emails within the same day mostly with a couple of hours but in rare occasion I would answer the next day.**

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/
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 9, 2021. This is not automatically granted.** Lab exemptions will be considered on a case-by-case basis at the discretion of the Lab Supervisor.

Students repeating the course, for whatever reason, are *not excused from the Brightspace 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/ 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/ 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 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/ .

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.

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/ .

Netiquette: *If you take part in forum discussions or read the comment sections of news stories online, you will have no doubt noticed that online culture often encourages highly uncivil discourse. In this class, however, we will collectively strive to create a harmonious and productive learning environment, and that means being very attentive to our language and tone. You can find an excellent set of suggestions for online netiquette on this website: familiarize yourself with the recommendations that this document lays out, as they articulate my own expectations. Note that we are all subject to the Human Rights Code, and that I absolutely will refer any flagrantly threatening or abusive behavior online to the Equity and Inclusive Communities office for investigation and follow-up. For any synchronous components of our course (Q&A sessions, office hours, the peer reviews), it is vital that you have a mic and, preferably, a webcam, and that you enable both when you are engaging in conversation with other people. When we communicate, things such as tone, facial expressions, and body language tell our listeners a lot of about how we want them to understand our message. I know it can be tempting to turn off your webcam in particular, but I ask you to use it when you're communicating synchronously with me or any other students in the class.*

6. Course Schedule

Note: Term begins July 2nd and ends August 16th. The University is closed on August 2nd (statutory holyday), and the examination period is Monday August 19 through Saturday August 25, inclusive.

For all important dates in the academic year please see calendar.carleton.ca/academicyear/ .

Lectures, RQs and HWs tentative timetable (subject to change by the instructor). Make sure to check the due time for the due date for every RQ and HW as stated on Brightspace.

Lecture	Topic
Jul 05	Ch 16 - Electric Charge, Conductors and Insulators, Coulomb's Law, Electric Field, Motion of Charge in **E** field, Conductors in Electrostatic Equilibrium and Gauss' Law for Electric Fields. RQ Ch16 is due.
Jul 07	Ch 17 – Potential Energy, Potential, Field and Potential, Conservation of Energy; moving charges, Capacitors, Dielectrics and Energy in a Capacitor. RQ Ch17 is due.
Jul 12	Ch 18 – Current, EMF & Circuits, Resistance & Resistivity, Kirchhoff's Rules, Series and Parallel Circuits, Power and Energy in Circuits, RC Circuits and Electric Safety. RQ Ch18 is due. HW1 Ch 16, HW2 Ch16-17 and HW3 Ch17 are due.
Jul 14	Ch 19 – Magnetic Fields, Magnetic Force on a Point Charge, Charged Particle Moving perp to a Uniform **B** Field, Charged Particle in a Uniform Magnetic Field, Charged Particle in Crossed **E** and **B** Fields and Magnetic Field due to an Electric. Current. RQ Ch 19 is due.
Jul 19	Ch 20 - Faraday's Law, Lenz's Law, and Inductance. Ch 21 - AC currents and voltages, with resistors, Capacitors in AC and Inductors in AC. RQ Ch 20-21 is due. HW4 Ch 18 and HW5 Ch18-19 are due.
Jul 21	Ch 22 - EM spectrum, Speed of EM waves, Travelling EM waves in a vacuum, Intensity (partial) and Polarization. Ch 23 - Wavefronts & Rays and Reflection. RQ Ch(s) 22-23 is due.
Jul 26	Ch 23 - Refraction, TIR and Thin lenses. Ch 24 – Lenses in combination, The Human Eye, Simple magnifier and Compound microscopes (qualitative only). RQ Ch(s) 23-24 is due. HW6 Ch(s) 20-21 and HW7 Ch 21-22 are due.

Jul 28	Ch 25- Constructive and destructive interference, Young's Double Slit, and Resolution of optical instruments. Ch 27 - Quantization, Blackbody Radiation, The Photoelectric Effect and X-Ray Production. RQ Ch(s) 25-27 is due.
Aug 02	**Civic Holiday**
Aug 04	Ch 27- The Bohr Model of the Hydrogen Atom and Atomic Energy Levels. Ch 28 - Wave particle duality, Matter waves (de Broglie), Electron microscope, Uncertainty Principle, Exclusion Principle, Lasers and Tunnelling RQ Ch(s) 27-28 is due. HW8 Ch(s) 23 and HW9 Ch 24-25 are due.
Aug 9	Ch 29 - Nuclear structure, Binding Energy, Radioactivity and Decay rates, half life, Biological effects of ionizing radiation, Nuclear Fission and Nuclear Fusion. RQ Ch(s) 29 is due.
Aug 11	Ch 30 - Fundamental Particles, Fundamental Interactions and Particle Accelerators. RQ Ch(s) 30 is due. HW10 Ch 25-27, HW11 Ch 27-28 and HW 12 Ch 28-29
Aug 16	Catch-up and course review **HW13 Ch 30 is due on Aug 19.**