

PHYS 1002 – Winter 2022

*** Course format subject to change based on recommendation from Public Health ***

Consult: <https://carleton.ca/covid19/>

Foundation of Physics 2 (Electricity and Magnetism) for physicists and engineering physicists. This course for Winter 2022 is an IN-PERSON WITH FLEXIBLE ONLINE/ON-CAMPUS ATTENDANCE. The format is called *HYFLEX*. It is a real-time synchronous course where the professor and students meet simultaneously in room Steacie 130 and online via the web conferencing tool Zoom, at scheduled days and times. The Professor share information, key ideas, theories, problems and concepts in an in-person and virtual course environment simultaneously. Participation in synchronous courses requires students to be on campus, or to have reliable, high-speed internet access, a computer (ideally with a large screen), and a headset with a microphone. PollEverywhere will be used to break up lecture time with a quick riddle, quiz, or brain teaser to engage the participants. All the lecture material will be posted on Brightspace to engage the participants.

It is encouraged to participate in-person with campus attendance.

Lecture sessions in of PHYS 2604 will be recorded and made available only to those within the class. Sessions will be recorded to enable access to students with internet connectivity problems, who are based in different time zone, and/or who have conflicting commitments. If students wish not to be recorded, they need to leave their camera and microphone turned off.

Please note that the lecture notes and the recordings are protected by copyright. Students are not permitted to reproduce or distribute lecture notes publicly for commercial or non-commercial purposes. The recordings are for your own educational use, but you are not permitted to publish to third party sites, such as social media sites and course materials sites. You may be expected to use the video and/or audio and/or chat during web conferencing sessions for participation and collaboration. If you have concerns about being recorded, please email me directly so we can discuss these.

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean of the Faculty of Science.

PHYS 1002 Foundations of Physics II

Hyflex Lectures: Monday 11:30 AM - 13:00 } Steacie Building Room: 103
Wednesday 11:30 AM - 13:00 }

Laboratory Sections: A1 Mon. 13:00 – 16:00 } Herzberg 4130
A2 Thu. 8:30 AM - 11:30 AM }
A3 Wed 13:00 - 16:00 }

Lecturer: Prof. Alain Bellerive
E-mail: alain.bellerive@carleton.ca
Telephone: 613-520-2600 ext. 7537
Office: Herzberg 3316
Office Hours: Monday 13:00-14:00 and Wednesday 13:00-14:00, or by appointment

Laboratory Supervisor: Dr. Igor Ivanovic
E-mail: igor@physics.carleton.ca
Telephone: 613-520-2600 ext. 5796
Office: Herzberg 3346
Office Hours: Posted on *Brightspace*, or by appointment

Teaching Assistants: Support, review material and assistance will be provided during the tutorial sessions.
Students will be able to work on assignment problems and suggested self-study problems.

Physics Drop-in Centre: Support will provide help with concepts, questions and problems. Online and in-person.
HP 3349 (Sunray Lab) Hours: Posted on *Brightspace*.

Calendar Description: An introduction to electricity, magnetism, electromagnetic fields, and wave motion. This is a specialist course for students intending to take further courses in physics.
Precludes additional credit for PHYS 1004 and PHYS 1008.

Prerequisites: You must have successfully completed:
(i). MATH 1004 Calculus for Engineering or Physics
or MATH 1002 Calculus & Introductory Analysis I (may be taken concurrently)
plus
(ii). PHYS 1001 Foundations of Physics I
or PHYS 1003 Introductory Mechanics and Thermodynamics
or PHYS 1007 Elementary University Physics I (with grade of at least B-).

If you do not have *both* of these requirements you *must* check with Prof. Bellerive and obtain permission of the Physics Department to take this course. This could be the case, for example, if you completed the equivalent of MATH 1004 or PHYS 1001 at another university.

Text: Physics for Scientists and Engineers with Modern Physics , 10th Edition
Raymond A. Serway and John W. Jewett
ISBN-10: 1-337-55329-8 or ISBN-13: 978-1-337-55329-2

If you bought the multi-volume text for PHYS 1001/1002 in the fall term then you already have the material for PHYS 1002 in the second volume (Part 4). The textbook contain all the volumes (Part 1, 2, 3, 4 & 5). The content that will be covered in PHYS 1002 is “Electricity and Magnetism”. A small number textbooks have been ordered by the Bookstore for students who do not have the multi-volume text already. Look at the Bookstore, or it might be possible to find a used text.

For the laboratories, the laboratory manual and all of the documents for each experiment are available on *Brightspace* associated with your lab section.

Academic Accommodation: *In case of a need for academic accommodation for religious obligation, disability, or other circumstance please talk to Prof. Bellerive as soon as practical and contact the appropriate office, as given at the end of this document.*

Course Schedule:

		Lectures		Labs & Tutorials & HW		
		Monday	Wednesday			
January	10	Course intro Math and Physics toolbox	12	Chapter 22: Electric Charge and Coulombs Law	Introductory tutorial Post HW #1 (due Jan 19)	
	17	Chapter 22: Electric Fields	19	Chapter 22: Electric Fields	Lab 1: DC circuits Post HW #2 (due Jan 26)	
	24	Chapter 23: Gauss Law and Electric Flux	26	Chapter 23: Gauss Law and Electric Flux	Tutorial # 1 Post HW #3 (due Jan Feb 2)	
	31	Chapter 24: Electric Potential	2	Chapter 24: Electric Potential	Lab 2: RC time constant Post HW #4 (due Feb 9)	
February	7	Chapter 25: Capacitance and Dielectrics	9	Chapter 26: Currents in Materials	Lab 3: Oscilloscope Post HW #5 (due Feb 16)	
	14	Chapter 27: Direct-Current Circuits.	16	Chapter 27: RC circuits	Tutorial # 2	
	Week of February 21-25, 2022 - Winter Break: no lectures or laboratories.					
	28	Review Problems Midterm Preparation	2	<i>Mid-term Test</i> (on-line / open book)	Tutorial # 3 Post HW #6 (due March 9)	
March	7	Chapter 28: The Effects of Magnetic Fields	9	Chapter 29: The Production and Properties of Magnetic Fields	Lab 4: Magnetic balance Post HW #7 (due March 16)	
	14	Chapter 30: Faraday's Law	16	Faraday's Law Review and Applications	Tutorial # 4 Post HW #8 (due March 23)	
	21	Chapter 31: Inductance and Circuit Oscillations	23	Review: Magnetic fields and Ampere's law	Lab 5: RLC circuits Post HW #9 (due March 30)	
	28	Chapter 32: Alternating Currents	30	Chapter 33: Maxwell's Equations and Electromagnetic Fields	Tutorial # 5 Post HW #10 (due April 11)	
April	4	Chapter 33: EM Waves	6	Review and catch-up Applications	Review Tutorial	
	11	Review Problems Final Preparation				
Exam period: April 14-28, 2022						

Grading Scheme:	Lab Experiments	25 %	}	Homework assignments (10)	25 %
	Theory	75 %		Tutorial evaluations (5)	5 %
				Mid-term test	15 %
		<hr/> 100 %		Final exam	30 %

The homework assignments are marked out of 100 (with feedback on *Brightspace*).
 In the case of a delay to hand-in an assignment due to illness, or for an unforeseeable situation, please contact the instructor.
 There will be penalties for late homework assignments.

Laboratories: The laboratory reports are marked out of 100.
 There are five (5) hands-on experiments as shown in the schedule.
 In order to pass the lab, you must perform all experiments and submit all reports.
 In the case of a delay or a missed lab due to illness, a medical note is required.

Experiment report types and weights:

DC circuits (inLab writeup)	20 %
RC time constant (full report)	20 %
Oscilloscope (full report)	20 %
Magnetic balance (inLab writeup)	20 %
RLC circuits (full report)	<hr/> 20 %
	100 %

Penalties for late reports:	one day late:	10 marks deducted (10%)
	up to one week late:	30 marks deducted
	up to two weeks late:	60 marks deducted
	over two weeks late:	no marks given

Homework Assignments - There will be weekly assignments, to be submitted and uploaded as a PDF file on *Brightspace*. The assignments are due on the Wednesday by midnight (*i.e.* before 11:59 pm). In the case of a delay due to illness, a medical note is required. In the work you submit, your method of solution and clarity of explanation are as important as your final result. Complete the analysis yourself, as the work you turn in must be your own.

Tutorials - There are one introductory tutorial, five regular tutorials and one review tutorial at the end of the term. These will take place during your regular lab period in Herzberg 3125 (4130), starting on Monday January 10, 2022. The first 30-40 minutes, a teaching assistant will solve key problems on the board – it will serve as a review of the material seen in class. The next 30-40 minutes will be for students to work on problems – students will have the opportunity to ask questions in an informal ambience. Discussion in groups is encouraged as long as the proper distance is obeyed. The tutorial concludes with a 20-minute quiz evaluation which you will do on your own and hand in for marking. The evaluation will consist of a new problem. Bring writing utensils and a calculator, plus a ruler if you want. Be sure also to bring your Student ID card. The relevant constants and formula sheet will be provided. You should not have a cell phone during the evaluation period. There is no evaluation in the introductory and review tutorials. Prepare for the tutorials in advance by reviewing your notes and attempting problems in the text. A list of suggested problems will be posted.

TUTORIAL EVALUATION MAKEUPS: if you miss a tutorial and its evaluation, immediately contact Dr. Ivanovic and explain why. If the reason is illness, a medical note is required. Students with valid reasons will be given written permission to write a makeup at the end of term. These will all be written at the end of the term (date and time to be announced).

Mid-Term Test - There will be an online 90-minute mid-term test held during the lecture time on Tuesday March 2, 2022. It will cover material discussed in the course up to the end of Tutorial # 2. It will be an open book exam.

Final Exam - The Final Examination, in April, will cover the entire course. It will be an online e-proctor exam. You will be allowed pen/pencil, an eraser, a calculator, a ruler and white paper for calculation and for the solutions of the long questions. A formula sheet will be provided. Be sure to have your student ID card for the final exam.

Cell Phones - Cell phones are not allowed during tutorial evaluations, tests, or the exam. Hence you cannot use the calculator function of a cell phone. Bring a real calculator.

Deferred Final Exam - This will replace only the Final Exam portion of the marks. Deferred Exams for the 2022 Winter term will be during the Summer term. Students with inadequate term work on the theory part of the course will not be permitted a Deferred Exam. Term work will be considered inadequate if less than 10 out of the possible 45 marks on Theory component of the course have been earned during the term.

Poll Everywhere:

polllev.com/alainbcarleton

University Policies

Grade Definition: In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59
A = 85-89	B = 73-76	C = 63-66	D = 53-56
A- = 80-84	B- = 70-72	C- = 60-62	D- = 50-52
F = <50			

Important dates and deadlines

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

Paul Menton Centre for Students with Disabilities (PMC)

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 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 me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Academic Regulations and Request for Academic Accommodations

<https://students.carleton.ca/course-outline/>

<https://carleton.ca/edc/teachingresources/administrative-pedagogy/academic-accommodations/>

Use of official university e-Proctoring

This course has timed online written assessments, which may consist of midterm and final examinations. The Carleton University e-Proctoring system will be used in your assessments, and requires the use of webcams, microphones, and/or smart phones.