

PHYS 1002 – Winter 2024

Foundation of Physics 2 (Electricity and Magnetism) for physicists and engineering physicists. This course for Winter 2024 is an IN-PERSON ATTENDANCE. It is a real-time synchronous course where the professor and students meet simultaneously in person. See Carleton Central for the location of the lecture room. The Professor shares information, key ideas, theories, problems and concepts in an in-person course environment. Participation in synchronous courses requires students to be on campus. Poll Everywhere 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 for reference. The interface Perusall will be used to cover the reading material that supports the learning objectives of the course. Thus, reading will be given for each assignment using the Perusall (<https://www.perusall.com/>) platform. Students will annotate, comment, respond to and upvote other comments made by their classmates in a social model of pre-class reading.

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

Given the nature of the class delivery, asynchronous recordings of the class periods are not a useful tool, and no recordings will be taken. The lecture notes and the example problems covered in class will be disseminated via Brightspace. Students are not permitted to reproduce or distribute lecture notes publicly for commercial or non-commercial purposes. The lecture notes 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.

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

Lectures: Wednesday 8:30 AM - 10:00 AM } Location: consult Carleton Central
Friday 8:30 AM - 10:00 AM }

Laboratory Sections: A1 Mon. 13:00 – 16:00 } Location: consult Carleton Central
A2 Thu. 8:30 AM - 11:30 AM }
A3 Wed 13:00 - 16:00 }

Lecturer: Prof. Alain Bellerive
E-mail: alain.bellerive@carleton.ca
Office Hours: 10:15-11:15 AM Wednesday & Friday, or by appointment

Laboratory Supervisor: Dr. Igor Ivanovic
E-mail: igor@physics.carleton.ca
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: *Fundamentals of Physics*, 12th Edition
Halliday, Resnick and Walker
ISBN: 978-1-119-77351-1

You will need to purchase a copy of the e-book text from Perusall.
This text is also used for PHYS1001; so the perpetual license is recommended.

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, namely Part 1, 2, 3, 4 & 5. The content that will be covered in PHYS 1002 is “Electricity and Magnetism”. For a hardcopy, 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		
		Wednesday	Friday			
January	10	Welcome and Chapter 26: Currents in Materials	12	Chapter 27 (27-1 / 27-2 / 27-3): Direct-Current Circuits.	Introduction to the lab & tutorial Post HW #1 (due Jan 19)	
	17	Chapter 22: Coulombs Law and Electric Force	19	Chapter 22 & 23: Electric Fields	Tutorial # 1 Post HW #2 (due Jan 26)	
	24	Chapter 23: Gauss Law and Electric Flux	26	Chapter 23: Gauss Law and Electric Flux	Lab 1: DC circuits Post HW #3 (due Jan Feb 2)	
	31	Chapter 24: Electric Potential	2	Chapter 24: Electric Potential	Tutorial # 2 Post HW #4 (due Feb 9)	
February	7	Chapter 25 (25-1) & Chapter 27 (27-4): Capacitance and RC circuits	9	Chapter 25 (25-2 to 25-7): Capacitors and dielectric	Lab 2: RC time constant Post HW #5 (due Feb 16)	
	14	Chapters 22-27 Problems and Applications	16	Review Problems (online) Midterm Preparation	Lab 3: Oscilloscope	
	Week of February 19-23, 2024 - Winter Break: no lectures or laboratories.					
	28	<i>Mid-term Test</i> (in-class)	1	Chapter 28: The Effects of Magnetic Fields	Tutorial # 3 Post HW #6 (due March 8)	
March	6	Chapter 29: The Production and Properties of Magnetic Fields	8	Magnetic fields and Ampere's law Review and Applications	Lab 4: Magnetic balance Post HW #7 (due March 15)	
	13	Chapter 30: Faraday's Law	15	Faraday's Law Review and Applications	Tutorial # 4 Post HW #8 (due March 22)	
	20	Chapter 31: Inductance and Circuit Oscillations	22	Chapter 32: Alternating Currents	Tutorial # 5 Post HW #9 (due March 29)	
	27	Chapter 33: Maxwell's Equations and Electromagnetic Fields	29	Chapter 33: EM Waves	Lab 5: Solenoid and RLC circuit Post HW #10 (due April 10)	
April	3	Chapters 28-33: Catch-up	5	Chapters 28-33: Problems and Applications		
	10	Review Problems Final Preparation				
Exam period: April 13-25, 2024						

Grading Scheme:	Lab Experiments	25 %	←	}	Homework assignments (10)	25 %
	Theory	75 %			Tutorial evaluations (5)	5 %
		<hr/> 100 %			Mid-term test	15 %
					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 (in Lab writeup)	20 %
RC time constant (full report)	20 %
Oscilloscope (full report)	20 %
Magnetic balance (in Lab 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 Friday by midnight (*i.e.* before 23:59). In the case of a delay due to illness, a medical note or a self-declaration form, is required. There will be penalties for a late submission. 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 and five regular tutorials. These will take place during your regular lab period in Herzberg 3125, starting on Monday January 8, 2024. 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 tutorial. 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, or a self-declaration form 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.

Mid-Term Test - There will be an online 90-minute mid-term test held during the lecture time on Wednesday February 28, 2024. It will cover material discussed Chapters 22-27. It will be an in-person closed-book exam. You will be asked to provide the solutions of the long questions in an exam booklet. A formula sheet will be provided.

Final Exam - The Final Examination, in April, will cover the entire course (Chapters 22-33). It will be an in-person closed-book exam. You will be allowed pen/pencil, an eraser, a ruler and a non-programmable calculator. You will be asked to provide the solutions of the long questions in an exam booklet. 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 exams. 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 2024 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:

pollev.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			

Very Important Dates and Deadlines: <https://calendar.carleton.ca/academicyear/>

- January 31, 2024 is the last day to withdraw from this courses with a full fee adjustment. Withdrawals after this date will result in a permanent notation of WDN on the official transcript.
- The last day for academic withdraw is March 15, 2024.

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/>**Use of official university e-Proctoring**

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

All Important Dates:

January 8, 2024: Winter term begins. First Day of Class.

January 31, 2024 is the last day to withdraw from this courses with a full fee adjustment (and no WDN on the official transcript).

February 19, 2024: Statutory holiday. University closed.

February 19-23, 2024: Winter break, no classes.

March 15, 2024 : Last day for academic withdrawal from winter courses.

March 29, 2024: Statutory holiday. University closed.

April 10, 2024: Last Day of Class. Classes follow a Friday schedule.

April 10, 2024: Winter term ends.

April 13-25, 2024: Final examinations in full winter, late winter, and fall/winter courses will be held.

Accommodations for Missed Work

Carleton recognizes that students may experience unexpected, temporary incapacitation (i.e., illness, injury, or extraordinary circumstances outside of a student's control). As a result, Carleton has put into place a protocol for students to apply for accommodations using a self-declaration form in the event of missed work. The form can be found at: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>

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 me 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 accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form [click here](#).

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: <https://carleton.ca/equity/sexual-assault-support-services>

Accommodation 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 will be provided to students who compete or perform at the national or international level. Write to me 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:

<https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

Academic- Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. Carleton University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold. Your teaching team has a responsibility to ensure that their application of the Academic Integrity Policy upholds the university's collective commitments to fairness, equity, and integrity. Examples of actions that do not adhere to Carleton's Academic Integrity Policy include: • Plagiarism • Accessing unauthorized sites for assignments or tests • Unauthorized collaboration on assignment and exam.

Sanctions for not abiding by Carleton's Academic Integrity Policy: A student who has not adhered to Carleton's Academic Integrity Policy may be subject to one of several sanctions:

1. If you take full responsibility for your actions, and it is the first time you have violated the policy, you will receive zero on the assessment. If you are found to have violated the policy but do not take responsibility, an additional grade deduction will be applied (e.g. an A- will become a B+)
2. Subsequent violations of the policy may result in more severe sanctions such as failing the course, suspension from all studies and/or expulsion.

Process of an Academic Misconduct Investigation

Step 1: The instructor believes misconduct has occurred and submits documentation to the Dean of the Faculty of Science.

Step 2: The Dean reviews documentation and can proceed with or dismiss the allegation.

Step 3: If sufficient evidence, the student receives an allegation statement by email. Ombuds services is copied on the email.

Step 4: The student provides a written response to the evidence provided.

Step 5: Either party may request a meeting between student, dean, and the ombudsperson.

Step 6: Dean informs the student of the decision.

Appeal: Student has the right to appeal the decision.

Additional details about this process can be found on the Faculty of Science Academic Integrity website. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students.

Plagiarism

Plagiarism is the passing off of someone else's work as your own and is a serious academic offence. For the details of what constitutes plagiarism, refer the Faculty of Science Academic Integrity website. To further understand Academic Integrity, consider attending the Learning and Support Academic Integrity Workshop. What are the Penalties for Plagiarism? A student found to have plagiarized an assignment may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from fulltime studies; and/or a reprimand; a refusal of permission to continue or to register in a specific degree program; academic probation; award of an FNS, Fail, or an ABS.

What are the Procedures?

3. All allegations of plagiarism are reported to the Dean of Faculty of Science. Documentation is prepared by instructors and/or departmental chairs.
4. The Dean writes to the student and the University Ombudsperson about the alleged plagiarism.
5. The Dean reviews the allegation. If it is not resolved at this level then it is referred to a tribunal appointed by the Senate.

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students.

<https://carleton.ca/registrar/academic-integrity/>

Assistance for Students

Academic and Career Development Services: <https://students.carleton.ca/departments/career-services/>

Writing Services: <http://www.carleton.ca/csas/writing-services/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>