

**PHYSICS**  
**Science**  
**Electricity & Magnetism**  
203-NYB-05 (all sections)  
Winter 2020

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<b>Pre-requisites</b>	Mechanics (203-NYA-05), Calculus I (201-NYA-05)
<b>Co-requisites</b>	Calculus II (201-NYB-05)
<b>Ponderation</b>	3-2-3 (3 hours of lecture, 2 hours of labs, and 3 hours of work outside class for each 5 hours of class time)
<b>Course objectives</b>	<p>The aim of this course is to analyze different physical situations and phenomena in terms of the fundamental laws of electricity and magnetism. This includes an analysis of: physical situations involving static electric charge, direct current circuits, magnetic fields and magnetic induction, alternating current circuits as well as experimental verification of some of the laws of electricity and magnetism.</p> <p>Detailed information regarding the objectives and standards for this course and the specific performance criteria is available at <a href="https://www.dawsoncollege.qc.ca/physics/program-documents/science/">https://www.dawsoncollege.qc.ca/physics/program-documents/science/</a>.</p>
<b>Course competencies</b>	<p>This course will allow the student to fully achieve the competency: OOUS: Analyze various situations and phenomena in physics using the basic laws of electricity and magnetism.</p> <ol style="list-style-type: none"><li>1. Analyze situations in physics associated with static electric charge and electric current.</li><li>2. Analyze situations in physics associated with magnetism and magnetic induction.</li><li>3. Apply the laws of electricity and magnetism.</li><li>4. Verify experimentally a number of laws of electricity and magnetism.</li></ol> <p>This course also contributes to partially achieve the competency: OOOU: Apply acquired knowledge to one or more subjects in the sciences.</p> <ol style="list-style-type: none"><li>1. Recognize the contribution of more than one scientific discipline to certain situations.</li><li>2. Apply the experimental method.</li><li>3. Solve problems.</li><li>4. Use data-processing technologies.</li><li>5. Reason logically.</li><li>6. Communicate effectively.</li><li>7. Show evidence of independent learning in their choice of documentation or laboratory instruments.</li><li>8. Work as members of a team.</li><li>9. Make connections between science, technology and social progress.</li></ol>
<b>Evaluation</b>	<p>The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website.</p>

There are two grading schemes. **Your final grade will be the higher of the two schemes.**

Assignments, quizzes and class tests <sup>†</sup>	55%	35%
Laboratory activities	15%	15%
Final examination	30%	50%

<sup>†</sup>Your teacher will provide a detailed breakdown of these components and a tentative test schedule during the first week of class.

In order to pass the course, students must show a basic understanding of the course material at the level covered in the lectures and in the lab. This is achieved by attaining a final grade of at least 60%, calculated according to the evaluation scheme above. **Note: course work not submitted by the due date may be penalized at the teacher's discretion.**

## Reference materials

- Your teacher will tell you which **one of the two textbooks** will be used in your section and whether you need an access code or not for the online homework system.
  - Serway custom package for Dawson College NYB** containing excerpts from *Physics for Scientists and Engineers (with Enhanced WebAssign)* by Serway & Jewett, 9th edition;
  - or
  - Knight custom package for Dawson College NYB, 2nd edition**, containing excerpts from *Physics for Scientists and Engineers (with Mastering Physics)* by Knight, 4th edition.

The custom packages are available at the bookstore and include a semester-long access code for the online homework system. Used textbook generally do not include an access code.
- Library copies:** Copies of the textbook are available on reserve in the Dawson Library.

## Teaching methods

The material will be presented using a mix of active learning activities, lectures, in-class problem solving, laboratory experiments and demonstrations. Laboratory periods will be used for experiments as well as class tests and lectures.

## Attendance & participation

Although class attendance is not compulsory, students should make every effort to attend all classes. In the event that a class is missed, the student is responsible for all material covered or assigned during that class. **Attendance during laboratory experiments and for class tests is however compulsory.** In the rare event that a student for valid reason (*e.g.* due to an intensive course, illness, *etc.*) is or anticipates to be absent during a laboratory experiment or for a class test, the student **must**, where possible, inform the teacher and provide the necessary documents before the absence or, at the latest, on the day of their return. If the absence is excused, students will have the opportunity to complete the assessment.

All other assessments (readings, quizzes, lab activities, *etc.*) missed due to absence are:

- assigned a grade of zero where the absence is not excused;
- given zero weight in the calculation of the final grade where the absence is excused.

For additional information regarding attendance, students should refer to the Institutional Student Evaluation Policy (ISEP section IV-C).

## Literacy standards

It is expected that students will be able to comprehend the course material and express themselves appropriately as a normal part of their academic performance in the course. Marks may be deducted for inadequate communication skills.

## Laboratory work

Experimentation is an essential part of science. Students will be expected to perform experiments and report on their results. Your teacher will provide you with instructions for lab experiments and activities (there is no manual to purchase). **Students must be present during the entire lab activity to receive credit.**

## Student conduct

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students (ISEP section II-D). Disruptions or excessive noise will not be tolerated. Students who do not comply with these rules will be asked to leave the class and may be referred to Student's Services for disciplinary action. **Mutual respect is the key to a harmonious learning environment.**

**Academic integrity**

Cheating, copying, or any other form of academic dishonesty will not be tolerated. Students should acquaint themselves with the policy of the College on plagiarism and cheating. According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a student's grade (ISEP section V-C). The usual penalty for the first instance of cheating will be a grade of zero for the piece of work in question to all parties involved (under certain circumstances, even a first offence may be penalized by failure in the course). A second offence may result in the failure of the course. Students should note that using someone else's laboratory data without authorization from the student and the teacher is cheating.

**Intensive course conflicts**

If a student is attending an intensive course, the student must inform the teacher, within the first two weeks of class, of the specific dates of any anticipated absences.

**Policy on religious observance**

Students observing religious holidays must inform their teachers, in writing, as prescribed in the ISEP Policy on Religious Observances, no later than the end of the second week of the impacted semester or term. This applies both to the semester or term, as well as to any final examination period. (ISEP Section IV-D) Please refer to the academic calendar for the exact dates. Forms for this purpose are available from your teacher. Your teacher will inform you of any modifications to planned course activities resulting from the teacher's own religious commitments.

**Course content**

Weeks	Topics	Chapter & Section
1-3	Electric fields	Ch.23: 1-7
3-4	Gauss's law	Ch.24: 1-4
4-6	Electric potential	Ch.25: 1-6 (7 & 8 optional)
7-8	Capacitance and dielectrics	Ch.26: 1-4 (5, 6 & 7 optional)
8-9	Current and resistance	Ch.27: 1, 2, 4-6 (3 optional)
9-10	Direct-current circuits	Ch.28: 1-5
11-12	Magnetic fields	Ch.29: 1-4 (5 & 6 optional)
12-13	Sources of the magnetic field	Ch.30: 1-5 (6 optional)
13-14	Faraday's law	Ch.31: 1-5 (6 optional)
15	Inductance	Ch.32: 1, 2 (3-5 optional)
	Alternating-current circuits (time permitting)	Ch.33: 1-9

The material to be covered is contained in the following chapters and sections of **Physics for Scientists and Engineers by Knight, 4th edition**.

Weeks	Topics	Chapter & Section
1	Electric charges and forces	Ch.22: 1-5
2-4	The electric field	Ch.23: 1-6 (7 optional)
5	Gauss' law	Ch.24: 1-6
6-7	The electric potential	Ch.25: 1, 2, 4-7 (3 optional)
7-8	Potential and field	Ch.26: 1-6 (7 optional)
9	Current and resistance	Ch.27: 1-5
10-11	Fundamentals of circuits	Ch.28: 1-9
12-14	The magnetic field	Ch.29: 1-8 (9 & 10 optional)
15	Electromagnetic induction	Ch.30: 1-5 (6-8 optional)
	AC circuits (time permitting)	Ch.32

**Comprehensive examination**

Second-year students can opt to complete the independent study portion of their comprehensive examination in this course. (This option is not available in continuing education courses.) The project will be evaluated on pass or fail basis independently from the course grade.