

PHYSICS
Radiation Oncology
Physics of Radiation Oncology
203-BXB-05 (Section 3)
Fall 2017

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| Teacher | Maria Dikeakos 7A.10, local 4009, mdikeakos@dawsoncollege.qc.ca |
| Pre-requisites | Mathematics 536 or equivalent; Physical Science 436 or equivalent |
| Co-requisites | None |
| Ponderation | 3-2-3 (3 hours of lecture, 2 hours of labs, and 3 hours of work outside class per week) |
| Course objectives | <p>This is a general physics course, covering topics in mechanics, electricity and modern physics, intended to provide a foundation for further studies in Radiation Oncology. Since students may enter the radio-oncology program from high school with only a fourth-year course in Physical Science as science background, or be adult students, who last studied physics some years before enrolling in the program, the course presents the basic physics concepts and skills necessary for the successful completion of many of the program objectives, especially those concerning the generation of radiation and its interaction with matter.</p> <p>Detailed information regarding the objectives and standards for the competencies related to this course and the specific performance criteria is available at https://www.dawsoncollege.qc.ca/oad/professional-development/ministerial-program-documents/.</p> |
| Course competencies | <p>This course will allow the student to fully achieve the competency:</p> <p>C4.1: Explain the structure of matter. 1. ...</p> <p>D1.2: Explain radioactive decay. 1. ...</p> <p>E4.1.3: 3. Apply knowledge of radiation physics 1. ...</p> <p>The study of physics also contributes to building analytical problem solving skills, critical thinking, and mathematical skills needed in the other components of the program.</p> |
| Evaluation | <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.**

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| Quizzes | 8% | 5% |
| Class tests (3) [†] | 42% | 25% |
| Laboratory activities | 20% | 20% |
| Final examination (cumulative) | 30% | 50% |

[†]Your teacher will provide 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.**

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| Reference materials | <ol style="list-style-type: none"> 1. College Physics by Serway and Vuille, 10th edition. This textbook is available at the bookstore. The e-book is available online; the price is lower (almost half) but, unlike the printed book, it usually has a limited lifetime (2 years) and it cannot be resold. 2. Used book: Students may purchase a second-hand copy of College Physics by Serway and Vuille (8th or 9th editions), however they will be responsible for cross-referencing assigned readings and problems. 3. 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 | <p>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 (<i>e.g.</i> due to an intensive course, illness, <i>etc.</i>) 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.</p> <p>All other assessments (readings, quizzes, lab activities, <i>etc.</i>) missed due to absence are:</p> <ul style="list-style-type: none"> • 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. <p>For additional information regarding attendance, students should refer to the Institutional Student Evaluation Policy (ISEP section IV-C).</p> |
| 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 who intend to observe religious holidays must inform their teachers in writing as prescribed in the ISEP Policy on Religious Observance (ISEP Section IV-D), within the first two weeks of the semester. 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**

The material to be covered is contained in the following chapters and sections of the text.

| Weeks | Topics | Chapter & Section |
|-------|---|-------------------|
| 1 | Mathematical Review | Ch.1 |
| 1-2 | Kinematics and Vectors | Ch.2 and 3 |
| 2-3 | Circular Motion and Gravity | Ch.7 |
| 3 | Dynamics | Ch.4 |
| 4 | Work, Energy and Power | Ch.5 |
| 5 | Momentum and Collisions | Ch.6 |
| 6-7 | Coulomb's Law, Electric Field and Potential | Ch.15 and 16 |
| 7-8 | Current and Resistance | Ch.17 |
| 8 | Direct Current Circuits | Ch.18 |
| 9-10 | Magnetism and Electromagnetism | Ch.19 and 20 |
| 10 | Alternating Current and Electromagnetic Waves | Ch.21 |
| 11 | Relativity | Ch.26 |
| 12 | Quantum Physics | Ch.27 |
| 13 | Atomic Physics | Ch.28 |
| 14 | Radioactivity and Nuclear Physics | Ch.29 |

**Questions
outside class**

- All regular day program teachers will be available in their respective offices to their students during posted office hours. In the first week, your teacher will inform you of their schedule and will post it outside their office.
- Room 7A.1 is the physics study room. At scheduled times, a teacher or peer tutor will be on duty there to answer your questions. The schedule of teachers and peer tutors will be posted outside of 7A.1 in the 2nd or 3rd week of term.