PHYSICS
Science
Mechanics
203-NYA-05 (all sections)
Winter 2020

Teachers

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Pre-requisites

Sec. V Physics 504, Mathematics 506 (or equivalent)

Co-requisites

Calculus I (201-NYA-05)

Ponderation

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)

Course objectives

The role of this course in the program is two-fold. First, it presents the basic principles of mechanics { kinematics, dynamics, and the three conservation laws (energy, momentum and angular momentum) { which are essential to the study of all the natural sciences. Second, it provides an opportunity for students to develop problem solving skills.

The laws and concepts introduced in this course are the foundation of our scienti c view of the world. Ideas about force, motion, energy and momentum arise again and again in all the sciences and in daily life. Understanding them is essential to the education of a scientist or an engineer. In every physics, chemistry, geology and even biology course at college and university, concepts such as energy and momentum, rst learned in mechanics, will be generalized, broadened, deepened and applied.

Detailed information regarding the objectives and standards for this course and the speci c performance criteria is available at https://www.dawsoncollege.qc.ca/physics/program-documents/science/.

Course competencies

This course will allow the student to fully achieve the competency:
OOUR: Analyze various situations and phenomena in physics using the basic principles of classical mechanics.

1. Describe the translational and rotational motion of bodies.
2. Apply the concepts and laws of dynamics to the analysis of the motion of bodies.
3. Measure the amount of work and energy involved in simple situations.
4. Apply the principles of conservation in mechanics.
5. Verify experimentally a number of laws and principles in mechanics.

Evaluation

The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and e ective 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.

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

Assignments, quizzes and class tests[y]	40%	25%
Laboratory activities	20%	20%
Final examination	40%	55%

[y] Your teacher will provide a detailed breakdown of these components and a tentative test schedule during the rst 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 nal 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

1. 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 NYA containing excerpts from *Physics for Scientists and Engineers (with Enhanced WebAssign) by Serway & Jewett, 9th edition*;
   or
   Knight custom package for Dawson College NYA, 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.
2. 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 e ort 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 nal 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 ressthe 4(ab253(.955 Td 00(m7(e)-373(course,)-38r,)-38

Course content

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	Concepts of motion	Ch.1: 1{8
2{3	Kinematics in one dimension	Ch.2: 1{6 (7 optional)
4{5	Kinematics in two or three dimensions (including circular motion)	Ch.3: 1{4; Ch.4: 1, 2, 4{6
6{7	Dynamics in one dimension	Ch.5: 1{7; Ch.6: 1{4, 6 (5 optional)
8-9	Newton's laws	Ch.7: 1{5
10	Dynamics in two dimensions	Ch.8: 1{5
11	Work and kinetic energy	Ch. 9: 1-6
12{13	Energy	Ch.10: 1{8
14	Impulse and momentum	Ch.11: 1{5 (6 optional)
15	Rotation of a rigid body	Ch.12: 1, 2, 5{7, 10, 11 (3, 4, 9, 12 optional)

The material to be covered is contained in the following chapters and sections of Physics for Scientists and Engineers by Serway & Jewett, 9th edition.

Weeks	Topics	Chapter & Section
1	Physics and measurements	Ch.1: 1, 3, 4, 6 (2 and 5 optional)
2	Motion in one dimension	Ch.2: 1{7
3	Vectors	Ch.3: 1{4
4{5	Motion in two dimensions	Ch.4: 1{5
6{7	The laws of motion	Ch.5: 1{8
8	Circular motion	Ch.6: 1, 2
9{10	Energy of a system	Ch.7: 1{9
11	Conservation of energy	Ch.8: 1{5
12{13	Linear momentum and collisions	Ch.9: 1{7 (8, 9 optional)
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