PHYSICS
Science
Astrophysics
203-BZA-05 (all sections)
Winter 2019

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Pre-requisites Calculus I (201-NYA-05), Mechanics (203-NYA-05), Waves, Optics & Modern Physics (203-NYC-05)

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

The primary objective is to give the Science student a comprehensive introduction to astronomy and astrophysics, from ancient times to the present. The course will emphasize the logic behind astronomical thinking, rather than the memorization of facts. Classical astronomy will be covered, but more emphasis will be placed on modern astrophysics. Mathematics will be calculus-level.

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

Course competencies

This course will allow the student to partially achieve the competency:
00UV: Apply the experimental method in a scientific field.

1. Represent various situations, drawing upon relevant concepts, laws and principles of science.
2. Solve problems using a method proper to science.
3. Apply techniques of experimentation or validation specific to science.

Evaluation

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.

Class tests[y] and quizzes	54%
Lab activities & experiments	16%
Final exam	30%

[y] 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

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 a ecting a student's grade (ISEP section V-C). The usual penalty for the rst 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 rst o ence may be penalized by failure in the course). A second o ence 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 con icts

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

Policy on religious observance

Students who intend to observe religious holidays must inform their teachers, in writing, within the rst two weeks of the semester as prescribed in the ISEP Policy on Religious Observances. (ISEP, Section IV D). This includes any religious holidays that occur during the nal exam period. 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 modi cations 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 texts.

Weeks	Topics	Content
1{3	Evolution of Astronomical Thought	Greek astronomy; the Copernican revolution; the contributions of Kepler and Galileo
4{6	Universal Gravitation	The Newtonian synthesis; orbital mechanics and the motion of planets, comets and spacecraft; tides and precession
5{6	Earth, Moon, Sun and Sky	The seasons; time and the calendar; eclipses; celestial coordinate systems; navigation
7{8	Atoms and Starlight	The electromagnetic spectrum; blackbody radiation; spectral lines; the Doppler shift
9{10	Tools of the Astronomer	Visible-light telescopes and spectroscopes; radio, infrared, ultraviolet and X-ray astronomy
11{12	The Properties of Stars	The distances, motions, colours and brightnesses of the stars; stellar spectra, and what they can tell us; the Hertzsprung-Russell diagram; binary stars and stellar masses
13{14	The Evolution of Stars; Exotic Objects	How stars are born; the sources of energy in the stars; star clusters and their H-R diagrams; how stars die; red giants, white dwarfs, neutron stars and black holes
15	Galaxies, Quasars and Cosmology	Our Milky Way Galaxy; a Universe of galaxies; the expanding Universe and the Hubble law; the age of the Universe; the primordial reball; dark matter and dark energy; cosmological models; the ultimate fate of the Universe

Some of the following labs will be performed:

1. Determining the orbit of Mars by Kepler's method
2. The constellations { nding your way around the sky
3. Measuring the Moon's diameter at a lunar eclipse
4. Finding the distance to the Crab Nebula
5. Hubble's constant and the expansion of the Universe
6. Classifying 2

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