



**John Abbott College**  
**Environmental Science and Technology**

Program:	Pathways, Transitions	Instructor:
Course Number:	105-003-RE	Office:
	AKA 982-003-50	
Ponderation:	4-1-3	Contact by
Prerequisite:	Sec. IV Science*	Office hours:
Semester:	Fall 2019	

Lectures:  
 Labs (2 hours):  
 Competency: 01PT

**A. Introduction and Objectives:**

This course is designed for those who have taken either \*Secondary IV Science and Technology or Applied Science and Technology but have not completed either:

- Secondary IV Environmental Science and Technology, or
- Secondary IV Science and the Environment

Students passing this course can take Chemistry 001 or Physics 001 courses in the future.

**B. Course Content:**

This course introduces physics, biology and chemistry, and follows the Quebec Science Guidelines. It covers the properties of matter, the periodic table, chemical changes and nuclear transformation, the laws of electricity and magnetism, transformations of energy and an introduction into genetics.

In keeping with the Quebec high school exit profile, students must demonstrate mastery of the following competency 01PT: *Analyze genetic phenomena, the behaviour of matter and the transformation of energy by using scientific principles..* This will be achieved in this course by addressing the following elements:

- Explain the properties of matter based on its representations and the periodic table
- Solve problems involving chemical changes and nuclear transformations
- Solve problems by using the laws of electricity and electromagnetism
- Solve problems involving the transformation of energy
- Describe the characteristics related to genetics
- Verify, using the experimental approach, several scientific laws and principles

Competency Code: 01PT

<i><b>Performance</b></i>	<i><b>Standard</b></i>
<b>Statement of the Competency</b>	
Analyze genetic phenomena, the behaviour of matter and the transformation of energy by using scientific principles.	
<b>Elements of the Competency</b>	<b>Performance Criteria</b>
1. Explain the properties of matter based on its representations and the periodic table.	1. Accurate description of the simplified atomic model (Rutherford-Bohr-Chadwick) 2. Accurate use of the concept of mole (Avogadro's number) 3. Correct identification of the periodicity of physical and chemical properties based on the periodic table

2. Solve problems involving chemical changes and nuclear transformations.	<ol style="list-style-type: none"> <li>1. Accurate calculation of concentrations (mole/L)</li> <li>2. Correct identification of the oxidation reaction</li> <li>3. Accurate determination of the molecular formula for salts</li> <li>4. Accurate calculation of the quantities of matter involved in a reaction</li> <li>5. Proper identification of the nature of a chemical bond (ionic or covalent)</li> <li>6. Proper identification of the endothermic or exothermic character of a reaction</li> <li>7. Correct description of the biogeochemical phosphorus cycle</li> <li>8. Proper description of isotopes and nuclear phenomena (fission, fusion and radioactivity)</li> </ol>
3. Solve problems by using the laws of electricity and electromagnetism.	<ol style="list-style-type: none"> <li>1. Appropriate use of Kirchhoff's laws (series, parallel or mixed circuits)</li> <li>2. Accurate calculation of equivalent resistances</li> <li>3. Correct use of Coulomb's law</li> <li>4. Appropriate description of the magnetic field of a solenoid</li> </ol>
4. Solve problems involving the transformation of energy.	<ol style="list-style-type: none"> <li>1. Accurate definition of the concepts of heat, temperature, mass, weight, force, effective force, work and energy (kinetic, potential and heat)</li> <li>2. Appropriate use of the relationship between mass and weight</li> <li>3. Appropriate use of the relationship between work, force and travel</li> <li>4. Appropriate use of the relationship between work and energy</li> <li>5. Appropriate use of the relationship between potential energy, mass, gravitational constant and travel</li> <li>6. Appropriate use of the relationship between kinematic energy, mass and velocity</li> <li>7. Appropriate use of the relationship between heat energy, specific heat capacity, mass and temperature variation</li> </ol>
5. Describe the basic characteristics related to genetics.	<ol style="list-style-type: none"> <li>1. Proper definition of the vocabulary associated with genetics (gene, allele, gamete, genotype and phenotype, homozygote and heterozygote, dominance and recessivity)</li> <li>2. Accurate description of genetic phenomena (heredity, cross-breeding)</li> <li>3. Accurate description of the stages of protein synthesis (transcription, translation)</li> </ol>
6. Verify, using the experimental approach, several scientific laws and principles.	<ol style="list-style-type: none"> <li>1. Appropriate implementation of an experimental procedure</li> <li>2. Accurate interpretation of results</li> <li>3. Appropriate communication of results</li> </ol>

### **C. Course Information:**

**Lectures:** 60 hours

Two 2-hour lectures per week. There will be three unit tests, covering approximately one third of the course each. In addition, there will be quizzes and assignments throughout the term. Also, preparation for up-coming laboratory sessions will be discussed during lecture time.

**Laboratory Sessions:** 30 hours

One two-hour laboratory session per week. These sessions will include practice in the basic techniques of experimental chemistry, and the relationship between science and technology is experienced first hand through laboratory experiments. Attendance at all laboratory sessions is obligatory. Instructions for all laboratory exercises will be posted on Omnivox.

#### **D. Evaluation:**

Assessment		Date	Elements of Competency
4 Unit Tests - 8% each	32%	~Week 4 ~Week 7 ~Week 11 ~Week 14	First five competencies listed in the order seen in class
Labs	20%	Weekly	6
Assignments, quizzes, mini project	18%	TBA	All
Final exam	30%	During Final Exam Period: Dec 11-20	All

Please note:

- To pass the laboratory portion of the course, a minimum of 60% of the total laboratory grade must be obtained. Failing this, a laboratory grade of **zero** will be given and a maximum grade of 55 will be allowed for the course.
- If a student passes the laboratory portion of the course, a grade of 60% or more on the final exam will guarantee a pass in the course.
- If the final exam mark is greater than the lowest of the four unit tests, then the final exam mark replaces the lowest of the unit test marks. i.e. the final exam is then worth 38% of the total course and the unit tests 24%
- Late work will not be accepted without a valid reason.
- Students must be available to write their final exam during the Exam Period (Dec 11 - Dec 20) Please be aware that the final exam schedule is set by the college and published later in the term.
- The final evaluation for this course includes the Final Exam (30%) and the Laboratories (20%).

#### **E. Required Materials and Course Costs:**

- Calculator: scientific model required (non-programmable)
- Lab coat (about \$25 at the bookstore)
- Lab glasses – Good quality safety glasses are available from the bookstore (about \$10) or from most hardware stores.
- Course packs - first one available at the bookstore (\$6.45) Up to 2 more may be added.
- Recommended: 1" binder for course material, duotang with dividers for labs

#### **F. Departmental Policies:**

- Regular attendance is expected. If lectures are missed, it is the responsibility of the student to cover the material missed and to be aware of any announcements made concerning assignments, quizzes, tests or changes to the laboratory schedule.
- Students must attend the laboratory session in which they are officially registered.
- There will be no make-up tests, quizzes, or laboratory periods. If you miss an evaluation session or deadline due to illness, you must notify your instructor as soon as possible. A valid medical note is required to prove absence for a medical reason. If a test is missed for a valid reason, then the final exam mark may be used as a basis for a substitute for the missed test mark.
- Periodically there will be workshops held during the laboratory period. Attendance is required. Quizzes or assignments may be given during these workshops.
- A special note concerning the use of chemicals:** this course uses chemicals as part of its normal teaching practices. If a student has experienced allergic reactions in the past due to any particular chemical or chemicals he or she must inform the instructor. In the event that an allergic reaction is experienced at the college, the student should report to Campus Security immediately (local 5226, 5231, or 9-514-398-7777).
- Cell phones are to be closed and packed away during all course activities.** Computers may only be used during class for pedagogical purposes at the discretion of the instructor.

## **G. College Policies:**

### **[Policy No. 7- IPESA, Institutional Policy on the Evaluation of Student Achievement](http://departments.johnabbott.qc.ca/wp-content/uploads/2017/08/Policy-7-IPESA.pdf)**

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a) Changes to Evaluation Plan in Course Outline (Article 5.3).

All changes to evaluation plan in the course outline must have documented unanimous consent from the regularly attending students affected by the change(s) before submission.

b) Evaluation (Article 6)

Teachers should evaluate and enter grades for a sufficient number of assessments in Gradebook in order that the College may advise DEC students of their progress by mid semester as per the ACADEMIC PROCEDURE: Academic Progress by Mid Semester.

c) Religious Holidays (Article 3.2)

Students who wish to miss classes in order to observe religious holidays must inform their teacher of their intent, in writing, within the first two weeks of the semester.

d) Student Rights and Responsibilities (Article 3.2 and Article 3.3)

It is the responsibility of students to keep a copy of all assessed material returned to them and/or all digital work submitted to the teacher for at least four (4) weeks past the grade submission deadline (See current Academic Calendar) in the event that they request a Final Grade Review (Refer to Article 8) .

Students have the right to receive graded evaluations, for regular day division courses, within two weeks after the due date or exam/test date, except in extenuating circumstances. A maximum of three (3) weeks may apply in certain circumstances (ex. major essays) if approved by the department and stated on the course outline.

e) Cheating and Plagiarism (Article 9)

Cheating and plagiarism are serious infractions against academic integrity which is highly valued at the College; they are unacceptable at John Abbott College. Students are expected to conduct themselves accordingly and must be responsible for all of their actions.

- College definition of Cheating:

Cheating means any dishonest or deceptive practice relative to examinations, tests, quizzes, lab assignments, research papers or other forms of evaluation tasks. Cheating includes, but is not restricted to, making use of or being in possession of unauthorized material or devices and/or obtaining or providing unauthorized assistance in writing examinations, papers or any other evaluation task and submitting the same work in more than one course without the teacher's permission. It is incumbent upon the department through the teacher to ensure students are forewarned about unauthorized material, devices or practices that are not permitted.

- College definition of Plagiarism:

Plagiarism is a form of cheating. It includes copying or paraphrasing (expressing the ideas of someone else in one's own words), of another person's work or the use of another person's work or ideas without acknowledgement of its source. Plagiarism can be from any source including books, magazines, electronic or photographic media or another student's paper or work.