Environmental Science and Technology
Mise à Niveau pour Science et Technologie de l'Environnement

Course Number	105-003-RE		Program	Pathways, Transitions
Ponderation	4-1-3		Instructor	
Prerequisite	Sec. IV Science *		Office	
Semester			Contact	
Lectures			Office Hours	
Labs (2 hrs)				
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

Performance	***Standard***
Statement of the Competency	
Analyze genetic phenomena, the behaviour of matter and the transformation of energy by using scientific principles.	
Elements of the Competency	**Performance Criteria**
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.	1. Accurate calculation of concentrations (mole/L) 2. Correct identification of the oxidation reaction 3. Accurate determination of the molecular formula for salts 4. Accurate calculation of the quantities of matter involved in a reaction 5. Proper identification of the nature of a chemical bond (ionic or covalent) 6. Proper identification of the endothermic or exothermic character of a reaction 7. Correct description of the biogeochemical phosphorus cycle 8. Proper description of isotopes and nuclear phenomena (fission, fusion and radioactivity)
3. Solve problems by using the laws of electricity and electromagnetism.	1. Appropriate use of Kirchhoff's laws (series, parallel or mixed circuits) 2. Accurate calculation of equivalent resistances 3. Correct use of Coulomb's law 4. Appropriate description of the magnetic field of a solenoid
4. Solve problems involving the transformation of energy.	1. Accurate definition of the concepts of heat, temperature, mass, weight, force, effective force, work and energy (kinetic, potential and heat) 2. Appropriate use of the relationship between mass and weight 3. Appropriate use of the relationship between work, force and travel 4. Appropriate use of the relationship between work and energy 5. Appropriate use of the relationship between potential energy, mass, gravitational constant and travel 6. Appropriate use of the relationship between kinematic energy, mass and velocity 7. Appropriate use of the relationship between heat energy, specific heat capacity, mass and temperature variation
5. Describe the basic characteristics related to genetics.	1. Proper definition of the vocabulary associated with genetics (gene, allele, gamete, genotype and phenotype, homozygote and heterozygote, dominance and recessivity) 2. Accurate description of genetic phenomena (heredity, cross-breeding) 3. Accurate description of the stages of protein synthesis (transcription, translation)
6. Verify, using the experimental approach, several scientific laws and principles.	1. Appropriate implementation of an experimental procedure 2. Accurate interpretation of results 3. Appropriate communication of results

C. Course Information:

Lectures: 60 hours

Two 1 1/2-hour lectures per week plus one 1 hour lecture. PowerPoint presentations and other documents related to lectures and class activities will be posted on Moodle. Occasionally, 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
3 Unit Tests - 10% each	30%	~Week 5 ~Week 10 ~Week 14	First five competencies listed in the order seen in class +Lab-related questions
Labs	25%	Weekly	6
Assignments and quizzes	15%	TBA	All
Final exam	30%	During Final Exam Period: Dec 13-22, 2022	All

Please note:

a) A student may drop the lowest unit test mark, if it is lower than the final exam mark so that the remaining unit tests are worth 20% of the final grade, and the final exam is worth 40% of the final grade. This is not available for a student assigned a grade of zero on a unit test because of cheating.
b) 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.
c) Not withstanding other class grades, 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.
d) Late work will not be accepted without a valid reason.
e) Students must be available to write their final exam during the Exam Period (Dec 13 - Dec 22, 2022) Please be aware that the final exam schedule is set by the college and published later in the term.
f) The final evaluation for this course includes the Final Exam (30%) and the Laboratories (25%).

E. Required Materials and Course Costs:

a) Calculator: scientific model required (non-programmable)
b) Lab coat (about $25 at the bookstore)
c) Lab glasses – Good quality safety glasses are available from the bookstore (about $10) or from most hardware stores.
d) Recommended: 1" binder for course material, duotang with dividers for labs

F. Departmental Policies:

a) Students are expected to attend all lecture and laboratory sessions. 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.
b) Students must attend the laboratory session in which they are officially registered. Missing a lab period without a valid reason will result in a grade of zero for the work assigned in that lab.
c) If you miss an evaluation session or deadline due to illness or other valid reason, 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 can be used as a basis for a substitute for the missed test mark.
d) Periodically there will be workshops held during the laboratory period. Attendance is required. Quizzes or assignments may be given during these workshops.
e) **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 6911, or 9-514-457-6911).
f) ***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:

Topic:	Resource:
Student rights and responsibilities (articles 3.2 and 3.3)	Policy 7:IPESA - Institutional Policy on the Evaluation of Student Achievement (version: June 12, 2019)
Changes to evaluation plan in the course outline (article 5.3)	
Religious holidays (articles 3.2.13 and 4.1)	
Cheating and plagiarism (articles 9.1 and 9.2)	
Cheating and plagiarism academic procedure and other resources	Academic Integrity: Cheating and Plagiarism Procedure (version: October 22, 2021) • **You need to log into Omnivox to access the above document** • **For PowerPoint on cheating and plagiarism** refer to the JAC Portal: My JAC Communities / Academic Council / Curriculum Validation Committee (CVC) / Course Outlines – Reference Documents / Academic Integrity • For link to interactive tutorial on how to cite sources correctly: http://citeit.ccdmd.qc.ca
Code of conduct	Policy 13: Policy on Student Conduct and Discipline Procedures (version: September 21, 2021)

H. PROVISO:

- Attendance: Due to the ongoing pandemic health issues, attendance policies may need to be adjusted by your teacher. The normal attendance expectations are outlined above and your teacher will inform you of any modifications as needed. Please note that attendance continues to be extremely important for your learning, but your teacher may need to define it in different terms based on the way your course is delivered during the semester.
- Please note that course outlines may be modified if health authorities change the access allowed on-site. This includes the possibility of changing between in-person and online formats.