**DEPARTMENTS: BIOLOGY / CHEMISTRY & CHEMICAL TECHNOLOGY / PHYSICS**

**REMEDIAL ACTIVITIES FOR SECONDARY IV ENVIRONMENTAL SCIENCE & TECHNOLOGY**

**Fall 2013**

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| **Instructor** | **Office** | **Phone**  **(**514-931-8731) | **Email** | **Department** |
| Manuel Toharia | 7B.19 | #1772 | mtoharia@place.dawsoncollege.qc.ca | Physics |
| TBA | TBA | TBA | TBA | Biology |

**Instructor Accessibility**

*Out of class communication methods:* ***EMAIL, LEA, MIO***

## COURSE OBJECTIVES

*Remedial Activities for Secondary IV Environmental Science & Technology* is designed to provide students with a proper background in the natural sciences, specifically in chemistry and physics. The competency attached to this course is to: Analyze genetic phenomena, the behaviour of matter and the transformation of energy by using scientific principles. On attaining this competency, students will be able to explain the properties of matter and the periodic table, solve problems involving chemical changes and nuclear transformations, solve problems by using the laws of electricity and electromagnetism and the transformation of energy, describe the basic characteristics related to genetics and verify several scientific laws and principles experimentally.

The material covered is intended to prepare students for entry into 202-001-50, R*emedial Activities for Secondary V Chemistry* and 203-001-50, *Remedial Activities for Secondary V Physics*.

## COURSE COMPETENCIES

The course content addresses the following elements of the course competency:

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

## COMPREHENSIVE EXAMINATION

## This course is not a candidate for comprehensive examination (CE) projects

## PRE-REQUISITE

It is recommended that students take High School Cycle 2 Year 2 Technical and Scientific mathematics (564-406) or Natural Science mathematics (565-406) or their equivalents (e.g., 201-013-50 or 201-007-50) prior to this course.

## PONDERATION

4-3-1 ( 4 hours of lecture, 3 hours of lab and 1 hours of work outside the classroom each week)

Course Hours

|  |  |
| --- | --- |
| Lecture | 60 hours per semester |
| Laboratory work | 15 hours per semester |
| Homework-Study | Minimum 45 hours per semester |

## EVALUATION SCHEME AND SCHEDULE

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.

Evaluation

|  |  |
| --- | --- |
| Assignments | 10% |
| Quizzes | 15% |
| Class Tests | 50% |
| Lab Reports | 25% |

In order to pass this course you must get at least an overall mark of 60%.

Students who fail the laboratory component of the course will receive no more than 55% as their final grade for the course.

## SUBMISSION OF MATERIAL FOR EVALUATION

1. Laboratory reports and home assignments must be completed and handed in no later than the time specified by the teacher. A grade of zero will normally be given for any report or assignment that is not submitted by the deadline.
2. All materials submitted for grading (i.e., tests, quizzes, laboratory reports, assignments, etc.) must be written in INK to preserve the student’s right to grieve.
3. Laboratory reports must be written in the manner described in the laboratory manual. Only persons whose names appear on the attendance sheet for an experiment will have the report for that experiment marked.

Competence in the Language of Instruction

In accordance with College policy, all materials submitted for evaluation must demonstrate proper use of the English language

## REQUIRED TEXT AND MATERIALS

Texts (All are available in the Dawson College Bookstore)

1. Marie-Danielle Cyr, Dominique Forget and Jean-Sébastien Verreault, *Observatory: The Environment*, 1st ed., St-Laurent, ERPI Inc.
2. Dawson College Laboratory Manual for *Remediation Activities for Secondary IV*.

Extra Materials

1. Students will find a calculator essential. The use of programmable calculators is not allowed during quizzes, tests and the final exam.
2. Safety glasses or prescription glasses and a lab coat **must** be worn in the laboratory at all times.

## TEACHING METHODS

## Lectures, laboratory work and reports, in class group problem-solving, home problem solving and self-study, quizzes, and progress tests.

## ATTENDANCE AND COURSE PARTICIPATION REQUIREMENTS

Students should refer to the Institutional Student Evaluation Policy (ISEP section III-C) regarding attendance.

Attendance at all lectures is expected. Failure to attend lectures is likely to cause failure in the course. In addition, should you miss a class during which an in-class assessment was given you will receive a grade of zero, unless you produce a valid reason for the absence (see the policy on rewriting of assessments below). This policy also applies to assignments linked to a class period that are to be completed at home and submitted at a later date. When a class is missed due to any absence, it is your responsibility to inform yourself of the material missed and study the material independently.

Attendance during laboratories is **compulsory**. Lab reports that may be assigned to a given lab session will not be accepted from students who were absent for that lab without a valid reason and the student will receive a grade of zero on that lab report.

If an assessment is missed because of illness, a religious holiday or a gym intensive an adjustment of the allocation of grades can be made. For illness a valid medical certificate must be provided. For religious holidays, the appropriate form must be submitted within the first 2 weeks of the semester (see religious holiday policy below). The same form can be used for gym intensives (see gym intensive policy below).

## LITERACY STANDARDS:

The ability to write clearly and concisely is an important skill in science. A total of 5% will be allotted for THE QUALITY OF THE WRITING on any written assessment (e.g. assignments, lab reports, essay questions, the CE research project, etc.) and tests. This mark will reflect the quality of the written English (spelling, grammar, organization, etc.). For class and lab tests, **up to 100%** of the marks allocated to a question will be deducted for the incorrect spelling of biological terms.

## LABORATORY SAFETY REGULATIONS

Students enrolling in this course will be exposed to chemicals which may be irritating or hazardous. For those persons with a sensitive medical condition such as allergies, additional precautions beyond the normal laboratory requirements of wearing safety glasses and laboratory coats are recommended. Such precautions may include wearing supplementary accoutrements such as additional eye protection or garments.

Exposure to certain chemicals during the first trimester of pregnancy, in particular, should be avoided. In such circumstances, delaying enrollment in the course is strongly recommended. Please consult with your professor on the advisability of continuing in the course or other courses of action available to you.

The following safety rules will be enforced starting on the first laboratory period:

1. **WEARING SAFETY GLASSES AND LAB COAT IS OBLIGATORY.** Students without safety glasses or lab coats will be asked to leave the laboratory area, and will be considered absent for that period.
2. No smoking, eating or drinking is permitted at any time in the laboratory.
3. Keep your coats, textbooks, and other bulky personal items out of the working area.
4. Report any accident, however minor, to your instructor at once.

## Non compliance with any of these safety regulations will result in expulsion from the Lab. Consequently the student will get a zero grade for that Lab exercise

## STUDENT OBLIGATIONS

Students are expected to be familiar with the:

* laboratory regulations as appended at the end of this outline and as described in more detail in the laboratory manual; and
* the College Policies on students’ rights and obligations, cheating and plagiarism, and literacy. Cheating and plagiarism are serious academic offences. Action in response to an incident of cheating or plagiarism, up to and including the failure of a student in the course, is within the power of the teacher, in accordance with the College’s Institutional Student Evaluation Policy (ISEP).

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)

## ACADEMIC INTEGRITY

1. Students must not talk to or communicate with their classmates when the classroom or pre-lab lecture is in progress. The lecture begins precisely at the assigned time or as soon as the lecturer enters the classroom.
2. Students must remain in their seats during classroom lectures and give their full attention to the lecturer.
3. Students must not leave the classroom before the lecture is completed without notifying the teacher at the beginning of the class. The full lecture period is required for your teacher to do an effective job of presenting the course objectives.
4. Students must not arrive late for a lecture without valid reasons. Any student who does arrive late must be seated as soon as possible near the **front** of the classroom with minimum disruption. At the end of the lecture, this student must speak to the teacher about the late arrival. For late arrivals at the laboratory sessions, the student must see the teacher immediately after entering the lab. The teacher may refuse to allow the student to carry out the experiment.
5. A student may leave the laboratory with permission for **very short** periods of time only if his or her partner is tending to the experimental set-up.
6. During laboratory sessions all students should remain, as much as possible, near their workstations, and work in a quiet non-disruptive fashion.
7. Classroom or laboratory assignments or reports must be submitted on or before the deadline dates.
8. Students are expected to write all tests, quizzes and final exams at the times scheduled by the teacher or the College. Teachers are not obliged to re-schedule tests, quizzes or examinations to satisfy individual student preferences.
9. There will be no make-up classroom tests or quizzes. In such cases where a student misses a test or quiz **with valid reason**, the teacher may arrange an alternative marking scheme for the student in question.
10. Students are responsible for all course material and announcements missed when they take an intensive course or for any other reason.
11. Your teacher has the right to ensure order and safety in the classroom and lab, and will take appropriate action to remedy any situation which arises because of non-compliance with the above regulations. **Dismissal from the classroom or the laboratory** are legitimate options on the part of the teacher. The student will then be required to meet with either the Chair of the Department of Chemistry & Chemical Technology or Physics who will decide on any future action to be taken.
12. The use of cell phones and unauthorized electronic devices is forbidden in the classroom and laboratory.

According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a student’s grade. (see ISEP section IV-C.)

## INTENSIVE COURSE CONFLICTS STATEMENT:

It is your responsibility to inform yourself of the dates of any gym intensives for which you are registered at the beginning of the semester and to plan your study periods accordingly. You must inform your teacher of these dates using the appropriate Biology Department form within the first 2 weeks of class. As with religious holidays, it is the policy of the Biology Department NOT to change class or lab quiz or test dates to accommodate gym intensives; as well if an assignment is due during a gym intensive, it is your responsibility to hand in the assignment **before** the due date, not after (or the late penalties will apply).

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:

If you wish to observe religious holidays and will miss a lab period or a class or lab quiz or test you must inform your teacher using the appropriate Biology Department form within the first 2 weeks of class. You must also include any religious holiday (for which you CANNOT attend school) that occurs during the final examination period (Dec 12 - 21). Your teacher will distribute the appropriate form during the first 2 classes. If an assignment is due on a religious holiday, it is your responsibility to hand in the assignment before the due date, not after (or the late penalties will apply).

Students who intend to observe religious holidays must inform their teachers in writing as prescribed in the ISEP Policy on Religious Observance. (ISEP Section III-D).

A form for this purpose is available at the end of this document.

## COURSE CONTENT & SCHEDULE

**CLASS TOPICS**

|  |  |
| --- | --- |
| THE MATERIAL WORLD | |
| **Chapter 1: Atoms and Elements** | REFERENCE: Cyr *et al*. |
| 1. What is an atom? | * 1. The simplified atomic model |
|  | The neutron |
| 1. The periodic classification of the elements | * 1. The periods of the periodic table |
|  | The periodicity of properties |
|  | 2.4 Atomic number |
|  | 2.5 Relative Atomic mass |
|  | Mass number |
|  | 2.6 Isotopes |
| 1. Representing atoms | 3.3 Representing atoms according to the simplified atomic model |
| 1. The concept of mole | * 1. Molar mass |
|  | * 1. Avogadro’s number |
| **Chapter 2: Molecules and Solutions** | REFERENCE: Cyr *et al*. |
| 1. What is a molecule? | * 1. Ions |
|  | Polyatomic ions |
|  | * 1. The nature of chemical bonds |
|  | Ionic bonds |
|  | Covalent bonds |
|  | * 1. The rules of chemical notation and nomenclature |
|  | The rules of notation |
|  | The rules of nomenclature |
| 1. Properties of solution | 2.2 Concentration |
|  | Molar concentration |
|  | 2.3 Electrical conductivity |
|  | The strength of electrolytes |
|  | 2.4 pH |
|  | More on pH |
| **Chapter 3: Different Forms of Energy** | REFERENCE: Cyr *et al*. |
| 1. What is energy? | 1.3 The relationship between heat, mass, specific heat capacity and temperature variations |
|  | 1.4 Kinetic energy |
|  | The relationship between kinetic energy, mass and velocity |
|  | 1.5 Potential energy |
|  | The relationship between gravitational potential energy, mass, gravitational field intensity, and height |
|  | 1.6 Mechanical energy |
|  | The relationship between mechanical, kinetic and potential energy |
| 1. Motion and forces | 2.1 Motion |
|  | The relationship between speed, distance and time |
|  | 2.2 Forces and changes in motion |
|  | 2.3 Types of forces |
|  | Gravitational force |
|  | Electromagnetic force |
|  | Strong and weak nuclear forces |
|  | 2.5 The effective force |
|  | 2.6 Work |
|  | The relationship between work and energy |
|  | The relationship between work, force and travel |
| **Chapter 4: Changes in Matter** | REFERENCE: Cyr *et al*. |
| 2. Chemical changes | 2.3 Stoichiometry |
|  | 2.4 Endothermic and exothermic reactions |
|  | 2.5 Types of chemical reactions |
|  | Oxidation |
| 3. Nuclear transformations | 3.1 Nuclear stability |
|  | 3.2 Radioactivity |
|  | 3.3 Types of nuclear transformation |
|  | Nuclear fission |
|  | Nuclear fusion |
| **Chapter 5: Electricity and Magnetism** | REFERENCE: Cyr *et al*. |
| 1. What is electricity? | 1.3 Electrical fields |
| 1. Static electricity | 2.2 Coulomb;s Law |
| 1. Dynamic electricity | 3.4 Kirchoff’s laws |
|  | The case of series circuits |
|  | The case of parallel circuits |
|  | Equivalent resistance |
| 1. What is magnetism? | 4.3 Magnetizing objects |
| 1. Electromagnetism | 5.1 Magnetization by electricity |
|  | The magnetic field of a solenoid |
|  | Electromagnets |
| **Chapter 8: The Biosphere** | REFERENCE: Cyr et al. |
| 1. What is the biosphere |  |
| 2. Biogeochemical cycles | 2.1 The carbon cycle |
|  | 2.2 The nitrogen cycle |
|  | 2.3 The phosphorus cycle |
| THE LIVING WORLD | |
| **Chapter 11: Genetics** | REFERENCE: Cyr et al. |
| 1. Factors responsible for character traits among living organisms | 1.1 Chromosomes |
|  | 1.2 DNA and genes |
|  | 1.3 Proteins |
|  | Protein structures |
|  | 1.4 Protein synthesis |
| 2. Principles of heredity | 2.1 Crossbreeding |
|  | 2.2 The presence of alleles |
|  | Homozygotes and heterozygotes |
|  | Dominant and recessive alleles |
|  | 2.3 Genotypes and phenotypes |
|  | 2.4 The law of segregation of alleles |
|  | 2.5 Determining possible genotypes and their probability |
|  | 2.6 The law of independent assortment of character traits |
| 3. Cloning | 3.1 Natural cloning |
|  | 3.2 Artificial plant cloning |
|  | 3.3 Animal cloning |
|  | 3.4 Human cloning |
|  | 3.5 Molecular cloning |
| 4. Meiosis and Mitosis | Class handout |
|  |  |

**Laboratory Schedule: Remedial Activities for Secondary IV Science & Technology**

**Winter 2013 When a laboratory is scheduled, it will be held as follows:**

**Time: Tuesday (section 06) or Thursday (Section 05) 7:00 p.m. – 10:00 p.m.**

|  |  |
| --- | --- |
| **Date and place** | Experiment |
|  |  |
| TBA  TBA  TBA  TBA | Composition of PotassiumChlorate  Conservation of Energy  Carbon Dating  Circuits |
| TBA | Genetics |

The exact dates will be announced in class and on LEA when the biology schedule is known.

## RELIGIOUS OBSERVANCE/ INTENSIVE COURSES FORM

Students who intend to observe religious holidays or who take intensive courses must inform their teachers in writing as prescribed in the ISEP Policy on Religious Observance. (ISEP Section III-D)

The following form must be submitted within the first two weeks of classes.

Name:

Student Number:

Course: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Date of Holiday Description of Holiday:**