SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Science & Nature

CODE NO. : NRT141 **SEMESTER:** F14

PROGRAM: Fish & Wildlife Conservation Technician, Adventure Recreation and Parks Technician, Natural Environment Technician and Technologist

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DATE: May 2014 **PREVIOUS OUTLINE DATED:** May 2013

APPROVED:

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CHAIR **DATE**

TOTAL CREDITS: 3

PREREQUISITE(S): None

HOURS/WEEK: 3

I. COURSE DESCRIPTION:

This course examines topics of science that provide a fundamental understanding of the relationship of scientific research, biology and chemistry to natural resource management. Topics include Science and the Scientific Method, The Hierarchy of Matter, The Species in an Evolutionary Context, Use of the Periodic Table, The Cell as the Fundamental Unit of Life, Water as a Medium for Life and Chemical Interactions in the Environment

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain and apply the scientific method to natural resource problem solving
   Potential Elements of the Performance:
   - distinguish between science and technology
   - describe the steps in the scientific method
   - using the scientific method demonstrate how you would solve a given natural resource problem
   - prepare a technical report to describe the results of a lab analysis of waste recycling at Sault College
   - describe the organization and purpose of each section of a technical report

2. Explain the Hierarchy of Matter.

   Potential Elements of the Performance:
   - show the connectivity and increasing complexity of nature from atomic particles to the total ecosphere
   - demonstrate the dependence of all levels of nature on chemical interaction
   - show how chemistry, biology and ecology are inter-related through the hierarchy of matter

3. Explain the relationship of species to evolutionary process

   Potential Elements of the Performance:
   - describe the various criteria used to determine species status
   - explain the basis for classifying living organisms

- categorize select examples of specimens from the field into their respective taxonomic groups
- correctly use the binomial system of classification
- give examples of morphological, anatomical, physiological, behavioral and ecological characteristics used to distinguish species

4. Explain cellular functions

   Potential Elements of the Performance:
   - identify the fundamental components of a living cell and explain their functions
   - characterize and provide examples of the 4 basic life molecules: sugars, proteins, lipids and nucleic acids
   - explain how cells obtain nutriment
   - summarize the processes of photosynthesis, respiration, diffusion, protein synthesis and exchange of genetic information
   - demonstrate division of function in multi-cellular organisms

5. Explain various characteristics of water as they relate to life systems.

   Potential Elements of the Performance:
   - describe various chemical and physical properties of water including: density, viscosity, polarity, surface tension, specific heat, solubility and pH
   - determine the dissolved oxygen concentration of water using a titration method
   - calculate acid/base neutralizations
   - determine the pH of water using a titration method and a pH meter
   - explain thermal stratification of lakes and lake turnover

6. Demonstrate the relationships of chemical interactions to important global environmental issues

   - Potential Elements of the Performance: explain bio-magnification
   - describe the causes for and impacts of the following global environmental problems:
     i) acid deposition
     ii) ozone depletion
     iii) global warming
     iv) eutrophication

7. Develop use of the compound microscope

Potential Elements of the Performance:

- use a compound microscope to observe and draw cellular material
- measure size of microscopic materials
- calculate the scale of drawings
- demonstrate proper care and handling of the microscope

8. Develop safe and correct lab technique with respect to chemical handling and instrument use.

Potential Elements of the Performance:

- discuss and apply safe lab procedures including handling of dangerous chemicals
- demonstrate knowledge of the Workplace Hazardous Materials Information System
- demonstrate use of balances, pH metre, glassware including pipettes and burettes, hot plates, fume hoods
- prepare solutions
- conduct titration procedures

9. Develop a working knowledge of the periodic table

Potential Elements of the Performance

- distinguish between metals, non-metals and noble gasses
- demonstrate relationships between protons, electrons and neutrons in identifying chemical elements
- determine electron configurations of atoms
- identify valence shells and valence electrons
- determine potential atomic arrangements of ions and covalent compounds
- calculate gram molecular weights of compounds
- demonstrate use of Lewis dot diagrams
- use tables to determine energy changes in combustion reactions

III. TOPICS:

1. The Hierarchy of matter
2. Science and the scientific method
3. The species in an evolutionary context
4. Use of the Periodic Table
5. Chemical interactions in the environment
6. Water as a medium for life
7. The cell as the fundamental unit of life

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Science & Nature Lab Manual, Science & Nature Study Guide, Lab Coat Lab safety glasses and calculator. (NOTE: a cell phone will not be allowed as a calculator in tests).

V. EVALUATION PROCESS/GRADING SYSTEM:

3 Unit Tests	60% (Each unit test is worth 20%)
6 Labs	40% (Each lab is worth 6.67%)
TOTAL	100%

The following semester grades will be assigned to students:

Grade	**Definition**	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the

	requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

COURSE OUTLINE ADDENDUM

1. Course Outline Amendments:
   The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

2. Retention of Course Outlines:
   It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

3. Prior Learning Assessment**:**
   Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

   Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

   Substitute course information is available in the Registrar's office.

4. Accessibility Services:
   If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Accessibility Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

5. Communication:
   The College considers ***Desire2Learn (D2L)*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Academic Dishonesty:
Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

7. Tuition Default:
Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of November (fall semester courses), first week of March (winter semester courses) or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

8. Student Portal:
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to https://my.saultcollege.ca.

9. Recording Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.