

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Science and Nature
CODE NO. : NRT141 **SEMESTER:** 1
PROGRAM: Fish and Wildlife and Parks and Outdoor Recreation

AUTHOR: Jerry Zuchlinski

DATE: Aug.2008 **PREVIOUS OUTLINE DATED:** May 2007

APPROVED:

Chair

DATE

TOTAL CREDITS: 3

PREREQUISITE(S): NONE

HOURS/WEEK: 3 hrs/week x 16 weeks

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For additional information, please contact Brian Punch, Chair
Natural Environment/Outdoor Studies & Technology Programs
(705) 759-2554, Ext. 2681

I. COURSE DESCRIPTION:

This course examines six topics of science that are fundamental to an understanding of the role of research and the relationship of biology and chemical interaction to natural resource management. Topics include Science and the Scientific Method, The Hierarchy of Matter, The Species in an Evolutionary Context, 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
- determine the alkalinity of water using a titration method
- 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

III. TOPICS:

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

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Science & Nature Lab Manual, Science & Nature Study Guide, Lab Coat

V. EVALUATION PROCESS/GRADING SYSTEM:

3 Unit Tests	60%
<u>6 Labs</u>	<u>40%</u>
TOTAL	100%

Late lab assignments and report values will be reduced at a rate of 10% per day for a maximum period of 5 days after the due date. After 5 days the lab assignment/report value will be zero.

All lab assignments and reports must be submitted regardless of lateness to pass the course.

Failure to attend a test without medical or severe personal reasons will result in a zero and no opportunity to make up the test will be offered.

Course re-writes are not offered.

The following semester grades will be assigned to students:

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

VI. SPECIAL NOTES:Special Needs:

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

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.

Communication:

The College considers **WebCT/LMS** 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 the **Learning Management System** communication tool.

Plagiarism:

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.

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.

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

<include any other special notes appropriate to your course>

VII. 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.

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