

**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE MARIE, ON**



COURSE OUTLINE

Course Title: ENVIRONMENTAL SCIENCE

Code No.: NRT115-3 Semester I

**Programs: FORESTRY, FISH & WILDLIFE,
PARKS & OUTDOOR RECREATION**

Author: JERRY ZUCHLINSKI

Date: JUNE 1.998 Previous Outline Date: JUNE 97

Approved:

A handwritten signature in black ink, appearing to read 'J. Zuchlinski', written over a horizontal line.

**Dean, Natural Resources
Programs**

Date

Total Credits: 3 Prerequisite(s): None

Length of Course: 3 hours/week X 16 weeks

Total Credit Hours: 48

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CODE NO.

I / COURSE DESCRIPTION

This course provides students with an understanding of the characteristics of and relationships between the various levels of chemical and biological organization from atoms to ecosystems. Significant processes and various environmental problems are examined.

II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE

A. Learning Outcomes:

1. Demonstrate an understanding of the relationship of the scientific method to natural resource technology.
2. Describe the hierarchy and characteristics of each level of organization of matter.
3. Describe characteristics which distinguish different types of non-living matter.
4. Describe the characteristics common to all living organisms.
5. Name and classify organisms according to the binomial system
6. Describe the basic life molecules which make up plants and animals.
7. Describe basic strategies of obtaining nutrients and trace the intake and movement of any nutrient into and through a plant or animal.
8. Demonstrate dependency and vulnerability of life processes in relation to human and natural induced environmental change.
9. Develop safe and correct lab technique with respect to chemical handling and instrument use
10. Develop use of the compound microscope

B. Learning Outcomes And Elements Of The Performance:

1. Demonstrate an understanding of the relationship of the scientific method to natural resource technology.

Potential Elements of Performance:

- 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 experiment on processes of diffusion, osmosis and dialysis
- describe the organization and purpose of each section of a technical report

2. Describe the hierarchy and characteristics of each level of organization of matter.

Potential Elements of the Performance:

- describe and give examples of each level of organization from sub-atomic particles to ecosystems
- correctly sort various examples of matter into their proper level of organization

3. Describe characteristics which distinguish different types of non-living matter.

Potential Elements of the Performance

- « differentiate between mass, volume, density, states of matter, mixtures, solutions, suspensions
- Differentiate characteristics of elements to their position in the periodic table
- Read and apply information from the periodic table such as chemical symbols, atomic organization, atomic mass and atomic number and apply electronegativity values to determine polar characteristics of molecules describe the differences between metals, non-metals and noble gases; ionic and covalent compounds; organic and inorganic materials; and acids and bases.
- « describe the chemical and physical properties of water and their relationship to ecosystem functions
- explain the pH scale

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- calculate gram molecular weights
- calculate neutralization requirements for acidic conditions
- complete simple chemical equations
- separate materials from a mixture on the basis of chemical and physical properties

4. Describe the characteristics common to all living organisms.

Potential Elements of the Performance

- explain and give examples of each of the 10 characteristics common to all living organisms
- label the parts of a plant and animal cell
- describe the function of the various organelles within a cell

5. Name and classify organisms according to the binomial system of classification

Potential Elements of the Performance:

- use proper convention in writing scientific names
- explain the basis for classifying living organisms
- categorize select examples of organisms into their respective taxonomic groups
- explain taxonomy and phylogeny

6. Describe the basic life molecules which make up plants and animals.

Potential Elements of the Performance

- distinguish between and describe the roles of each of the following: carbohydrates, lipids, proteins and nucleic acids
7. Describe basic strategies of obtaining nutrients and trace the intake and movement of any nutrient into and through a plant or animal.

Potential Elements of the Performance

- differentiate between the process of diffusion, osmosis, dialysis and active transport

- summarize the processes of photosynthesis and respiration and their relationships to ecosystem function
8. Demonstrate dependency and vulnerability of life processes in relation to human and natural induced environmental change.

Potential Elements of the Performance:

- describe the causes for and impacts of the following global environmental problems:
 - i) acid deposition
 - ii) ozone depletion
 - iii) global warming
 - iv) deforestation
 - v) organic toxins
 - vi) eutrophication
 - vii) soil degradation

9. 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 pipets and burets, hot plates, fume hoods

iO. 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

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IIL TOPICS

- 1) Scientific Foundations
- 2) Natural Order
- 3) The Chemistry of Nature
- 4) The Structural and Functional Components of Life
- 5) Environmental Problems
- 6) Laboratory Procedures and Practices

IV, REQUIRED RESOURCES/TEXTS/MATERIALS

1. Environmental Science Study Guide
2. Environmental Science Lab Manual
3. Lab Coat

V. EVALUATION PROCESS/GRADING SYSTEM

3 Unit Tests	50%
Assignments	15%
Labs	<u>35%</u>
	100%

Lab assignments and report values will be reduced at a rate of 10% per day for late submissions for a period of 5 days after the due date. After 5 days the lab assignment/report value will be zero. All labs/assignments/reports must be submitted regardless of lateness to pass the course.

Method of assessment (grading method). The following letter grade will be assigned:

A+	Consistently outstanding	(90%-100%)
A	Outstanding achievement	(80%- 89%)
B	Consistently above average achievement	(70%- 79%)
C	Satisfactory or acceptable achievement in all areas subject to assessment	(60%- 69%)
R	Repeat -- The subject has not achieved the objectives of the course and the course must be repeated	(Less than 60%)

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- CR Credit exemption
- X A temporary grade, limited to situations with extenuating circumstances^ giving a student additional time to complete course requirements.

NOTE: Students may be assigned an "R" grade early in the course for unsatisfactory performance.

VI. SPECIAL NOTES:

- Special Needs
If you are a student with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room EI204, Ext. 493, 717, 491 so that support services can be arranged for you.
- Plagiarism
Students should refer to the definition of "academic dishonesty" in the "Statement of Student Rights and Responsibilities".

Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or other such penalty, up to and including expulsion from the course as may be decided by the Professor.

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.