

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: ENVIRONMENTAL SCIENCE

CODE NO.: SCI115-3 SEMESTER: ONE

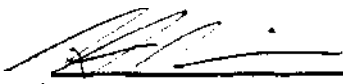
PROGRAM: FORESTRY TECHNICIAN

AUTHOR: GORD STONE

DATE: DECEMBER 1991 PREVIOUS OUTLINE DATED: JUNE 1989

APPROVED:

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TOTAL CREDIT HOURS: 48

PREREQUISITE(S): None

I. PHILOSOPHY/GOALS:

An introductory course to give students a basic understanding of chemical principles and biological processes, and practical applications of these for forest environments. Laboratory sessions will stress proper laboratory procedures, safety in chemical handling, and microtechnique. Other topics include nutrients and their cycles, environmental pollutants, and essential life processes.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will be able to:

1. Demonstrate knowledge of and be able to apply physical concepts of the property of matter including: mass, volume, density, specific gravity, states of matter, mixtures and solutions.
2. Describe ionic, atomic and molecular structure, and apply this to common materials required for life.
3. Demonstrate familiarity with chemical symbols, and be able to name simple compounds based on these symbols.
4. Distinguish, by stating essential properties, between:
 - i) Metals and nonmetals
 - ii) Organic and inorganic compounds
 - iii) Acids and bases
 - iv) Oxidation and reduction reactions
 - v) Endothermic and exothermic reactions
5. Use the periodic table and other knowledge to write and balance simple chemical equations.
6. Briefly summarize in chart form, the major nutrient cycles and the energy cycle in forest ecosystems, and describe how man's activities affect these cycles.
7. State and explain eight characteristics that all living things possess.
8. Demonstrate by means of a flow chart how many biological problems may be solved employing the scientific method.

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II. STUDENT PERFORMANCE OBJECTIVES: (cont'd)

Upon successful completion of this course the student will be able to:

9. Classify correctly any organism, given the group names and headlines in order.
10. Draw a chart placing any component of the levels of organization of matter in correct relationship to all others in "the hierarchy.
11. Differentiate, using biological examples, between the processes of osmosis, diffusion, dialysis, active transport, phagocytosis and pinocytosis.
12. Trace the intake and movement of any nutrient into and through a plant or animal, and indicate forces involved.
13. Demonstrate mastery of the compound microscope and cell structure from plant and animal tissue provided to prepare USABLE wet mounts of individual cells, identify all visible parts, and state their functions.
14. Describe the major types of plant tissues and cells, and how they differ from their animal counterparts.
15. Name and describe the importances of the major groups of organic molecules involved in energy flow.
16. Illustrate by means of summary diagrams and charts the processes of photosynthesis and respiration, and their relationships.
17. Draw a sketch of the fixed energy cycle to summarize the steps of energy flow.
18. Demonstrate knowledge in a laboratory setting of:
 - a) laboratory glassware and its proper use and maintenance
 - b) standard lab equipment
 - c) safety procedures

PROPOSED LAB SESSIONS: There will be laboratory sessions approximately every second week. The goals of the laboratories are primarily:

1. To familiarize students with laboratory equipment, safety procedures, and basic techniques.
2. To observe practical demonstrations that reinforce what was studied in theory classes.

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II. STUDENT PERFORMANCE OBJECTIVES: (cont'd)

LAB # TOPIC

1. Laboratory Methods & Safety
2. Obtaining the Density of Unknowns.
3. Separation of Components of Mixtures
4. Acids, Bases and pH
5. Basic Microscopy and Cell Structure
6. Nutrition of Cells and Material Movement
7. Photosynthesis
8. The Chemical Basis for Life (organic molecules)

III. TOPICS TO BE COVERED:

<u>Topic</u>	<u>Periods</u>	<u>Description</u>
1	1	Properties of Matter: - mass, volume, density, * specific gravity - states of matter - pure substances, solution, ** mixtures - elements and compounds
2	2	Atoms and Molecules: - atomic structure-protons, electrons and neutrons - symbols and chemical formulas - molecules and ions - naming simple compounds
3	1	Chemical Elements and Compounds: - metals and nonmetals - gases - organic and inorganic compounds - the periodic table
4	2	Chemical Reactions: - energy and chemical reacting - oxidation and reduction - acids, bases and pH - writing and balancing simple equations

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III. TOPICS TO BE COVERED: (cont'd)

<u>Topic</u>	<u>Periods</u>	<u>Description</u>
5	1	Applied Chemistry: - nutrient cycles in soil, air and water - man's impacts on natural cycles - pollutants and additives to natural ecosystems, and impact on natural resources
6	2	Background of Biology: - characteristics of life - the scientific method for problem solving - the origin of life - classification of living things
7	2	Cell Structure and Function: - microscopy and lab procedure - cell components and their functions - plant vs. animal cells
8	1	Nutrition of Cells: - cell membranes and material movement - processes of water/food movement
9	1	Organic Molecules of Life: - structure, importances of major organic molecules
10	2	Essential Life Processes and the Energy Cycle: - photosynthesis - respiration - the energy cycle

IV. EVALUATION METHODS:

Students will be graded on the basis of their performance in four theory tests and eight laboratory report hand-ins.

Term Tests	60%
Laboratory Hand-ins (reports, sketches, etc.)	40%
	100%

Grading:	A+	90 - 100%
	A	80 - 89%
	B	70 - 79%
	C	60 - 69%
	I	0 - 59%

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V. REQUIRED STUDENT RESOURCES:

Environmental Science - Laboratory Sessions, 1991

TEXT; There is no one textbook assigned to this course. However, any basic chemistry and biology texts will be of use to the student needing extra assistance.

READINGS: In virtually every unit of the course, there will be suggested and/or assigned reading to complement the material given in class or module write-ups.

VI. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.