

revised July 86

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: BIOLOGY/ECOLOGY

Code No.: BIO 114-3

Program: FOREST TECHNICIAN

Semester: I

Date: MARCH, 1985

Author: H. A. COOPER

New: _____ Revision: X

APPROVED:


Chairperson

Apr. 17/85
Date

CALENDAR DESCRIPTION

BIOLOGY/ECOLOGY

BIO 114-3

COURSE NAME

COURSE NUMBER

PHILOSOPHY/GOALS: This is an elementary course in biology and ecology designed for resource management students. It covers the organization of life and the vital processes of plants, animals, and ecosystems. Emphasis is on structure and function of cells, plant growth and development, and energy flow through forest ecosystems. Field and laboratory work are stressed.

METHOD OF ASSESSMENT (GRADING METHOD): Final marks will be based on:

Four tests on theory/lab material	- 55%
Laboratory sketches	- 30%
Lab assignments and quizzes	- 15%
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	100%

Laboratory drawings will be marked out of 10. One mark is deducted per day for late submissions. After seven days a "0" grade will be recorded, BUT the drawing must be submitted prior too the final test.

Quizzes will be marked out of 10 and be impromptu at beginning of some labs.

GRADES: A = 80% or over consistently
B = 70-79%
C = 60-69%
I = less than 60%

If total accumulated mark is 60%+ - no rewrite. If accumulated mark is 55-60% and less than two failed tests, student must rewrite the worst term test. If accumulated mark is less than 55%, student must write one final exam.

TEXTBOOK(S):

Arms, Karen and P.S. Camp. 1982. Biology, 2nd edition. CBS College Publications. Holt, Rinehart and Winston. Philadelphia. pp. 942

Biology/Ecology Lab Manual

UNIT	HOURS	TOPIC	REFERENCE
I	4	<u>Introduction to the Biological Background</u> Characteristics of Living Things The Scientific Method Biological Classification	Chapter 1
		Levels of Organization of Matter	Chapter 15
II	7	<u>Community & Ecosystem Study I</u> Flow of Energy in Food Chains, Webs, Pyramids Factors Affecting the Environment Adaptations to the Environment Interrelationships Among Living Organisms	Ch. 45, 49
III	10	<u>Characteristics of Communities & Ecosystems</u> Field Trip Comparing Communities Ecotones Niches & Habitats in a Forest Stratification Ecosystem Development & Succession	Ch. 49, 50
IV	5	<u>Energy Flow and Aquatic Ecosystems</u> Detailed Energy Flow Budgets Comparison of Terrestrial & Aquatic Ecosystems & Adaptations	Ch. 49, 50

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UNIT	HOURS	TOPIC	REFERENCE
V	8	<u>Cell Structure & Function</u> Components & Function of Typical Animal & Plant Cells Specialization in Plant Cells & Tissues	Chapter 4 Labs 1,2,3
VI	14	<u>Plant Development & Growth</u> Monocots vs. Dicots Root, Stem, Leaf Structure Primary & Secondary Growth Leaf Colouration & Fall Woody Tissue Components	Labs 5,6,7,8 Ch. 43, pp. 704-720 Ch. 44, pp. 723-727, 734-735
VII	6	<u>Nutrition of Plants & Animals</u> Cell Membranes & Material Movement Movement of Food & Water in Plants Digestion of Heterotrophs	Chapter 5 Chapter 44 Chapter 31, Lab 9
VIII	8	<u>Organism Function - The Need for Energy</u> Organic Molecules Photosynthesis Respiration The Fixed Energy Cycle	Ch. 3,7,8 Lab 10,11,12

BIOLOGY/ECOLOGY - PERFORMANCE OBJECTIVES

UNIT 1 - INTRODUCTION TO THE BIOLOGICAL BACKGROUND

To successfully complete this unit, the student must satisfactorily be able to:

1. Distinguish between the science of Biology and Ecology by using correct definitions.
2. State eight characteristics that all living things possess.
3. Demonstrate by means of a flow chart how many biological problems may be solved employing the scientific method.
4. Classify correctly any organism, given the group names and headlines in random sequence.
5. Draw a chart placing any component of the levels of organization of matter in correct relationship to all others in the hierarchy.

UNIT II - COMMUNITY AND ECOSYSTEM STUDY I

On completion of this unit, the student will be able to:

1. Illustrate the differences between food chains, webs and pyramids, using common, e.g., at each trophic level.
2. Draw a graph or tolerance curve to show how environmental factors affect growth or development.
3. State various adaptations any common plant or animal has to overcome these environmental influences.
4. Describe the effect one species or population has on another using the titles: parasitism; disease; predation; amensalism; commensalism; competition.

UNIT III - CHARACTERISTICS OF COMMUNITIES & ECOSYSTEMS

On completion of this unit, the student will be able to:

1. Prepare a short report and summary chart comparing the abiotic and biotic features of three different habitats, given appropriate physical and chemical testing equipment on field trips to the areas.

2. Illustrate by means of a sketch of a continuum index how the principle of edges and ecotones are significant.
3. Define and differentiate between the niche and habitat of a forest species.
4. Describe the importance of stratification in a forest, giving valid examples.
5. Describe the nature of succession and outline stage-by-stage the progression observed in aquatic and terrestrial ecosystems.

UNIT V - CELL STRUCTURE AND FUNCTION

On completion of this unit, the student will be able to:

1. 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.

Describe the major types of plant tissues and cells, and how they differ from their animal counterparts.

UNIT VI - PLANT DEVELOPMENT AND GROWTH

On completion of this unit, the student must be able to:

1. Illustrate or identify from a sketch the following plant growth regions, cells, and tissues:
 - a. Primary growth of monocot and dicot stems, roots, leaves
 - epidermal tissue
 - cortex and component cells
 - pericycle and endodermis
 - vascular tissue - xylem, phloem
 - cambium layers
 - guard cells and stomata
 - pith
 - b. Secondary growth of woody dicots - root or stem
 - above, plus cork layers
 - primary and secondary xylem layers
 - primary and secondary phloem layers

2. Write down in concise form a description of the development and functions of tissues above.

UNIT VII - NUTRITION OF PLANTS AND ANIMALS

On completion of this unit, the student must be able to:

1. Differentiate, using biological examples, between the processes of osmosis, diffusion, dialysis, active transport, phagocytosis and pinocytosis.
2. Trace the intake and movement of any nutrient into and through a plant or animal, and indicate forces involved.

UNIT VIII - ORGANISM FUNCTION - THE NEED FOR ENERGY

On completion of this unit, the student must be able to:

1. Name and describe the importances of the major groups of organic molecules involved in energy flow.
2. Illustrate by means of summary diagrams and charts the processes of photosynthesis and respiration, and their interrelationships.
3. Draw a sketch of the fixed energy cycle to summarize the steps of energy flow.

SUGGESTED READING

There are a wide variety of other Biology and Ecology texts in the Learning Resources Centre. For information regarding ones available to assist students with a weak background in biology, he/she should consult the instructor.