

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

COURSE OUTLINE

Course Title: BIOLOGY/ECOLOGY

Code No.: BIO 114-3

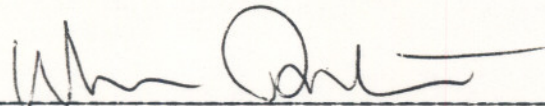
Program: FOREST TECHNICIAN

Semester: I

Date: SEPTEMBER, 1988

Author: G.L. STONE

New: \_\_\_\_\_ Revision: X

APPROVED:   
Chairperson

August 24/88  
Date

Warren Robertson



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 term tests	50%
Reports	20%
Labs	30%
	100%

**GRADING:**

- A+ = 90%-100%
- A = 80%-89%
- B = 70%-79%
- C = 60%-69%

**REWRITES:**

Students receiving a final grade of 60% based on term tests and lab results will pass the course. Students receiving a final grade between 55-59% will rewrite the unit test on which performance was poorest. Students receiving less than 55% or failing a rewrite will receive an "R" grade.

Successful completion of a rewrite will be given a "C" grade. Rewrites are a privilege, not a right.

**TEXTBOOK(S):**

Andrews, W.A. and D. K. Moore, 1986. Investigating Terrestrial Ecosystems. Prentice-Hall, Canada, Scarborough. 293 p.

Biology/Ecology Lab Manual

BIOLOGY/ECOLOGY 114-3 COURSE OUTLINE

<u>Hrs.</u>	<u>Topic</u>	<u>References</u>
<u>UNIT I</u>		
1	<b>INTRODUCTION:</b> pretest; how to succeed in biology; how to use textbook; lab manual; evaluation, grading and rewrites.	- notes - course outline
3	<b>BACKGROUND OF BIOLOGY:</b> Biology vs Ecology; Levels of Organization; Scientific Method & Problem Solving What, Why & How of Biology (L-1)	- notes - Andrews, Ch. 1 - notes, Arms & Camp - woodlot field trip
<u>UNIT II</u>		
8	<b>LIFE &amp; BASIC LIFE PROCESSES:</b> Origin of Life Energy Flow Organic Molecules (L-2) Characteristics of Life Respiration Photosynthesis (L-3)	- video, textbooks - notes, manual - Arms & Camp C-3 - notes - Andrews C-1 - manual
<u>UNIT III</u>		
8	<b>STRUCTURE OF AN ECOSYSTEM:</b> Components of Communities & Ecosystems Habitat, Niche, Trophic Levels, Food Chains and Webs, Ecological Pyramids, Factors Affecting Environment, Adaptations to Environment, Inter-relationships between Organisms Comparison of Microhabitats (L-4)	- notes - Andrews C-2 C-3 C-5 C-9, 10, 11 - field trip - Andrews C-9,10,11
4	<b>FLOW OF MATTER &amp; ENERGY IN ECOSYSTEMS:</b> Flow of Energy in Ecosystems Flow of Water in Ecosystems Biogeochemical Cycles	- filmstrip - Andrews C-3
8	<b>ECOLOGICAL SUCCESSION:</b> Stratification-horizontal & vertical -aquatic & terrestrial Ecosystem Development & Succession  Types of Primary Succession (L-5) -from rock, sand and soil	- notes - notes - Andrews C-4 - field trip

BIOLOGY/ECOLOGY - PERFORMANCE OBJECTIVES

UNIT IV

- 4 **CELL STRUCTURE AND FUNCTION:**  
Components & functions of typical animal and plant cells (L-7)  
Specialization in Cells (L-8)
- 4 **SPECIALIZED PLANT CELLS & TISSUES:**  
Cell & Tissue Development in Plants  
Specialized Cell Types (L-8)  
Tissue Differentiation - Epidermis, Vascular Tissue, Cambium, etc.
- notes
  - manual
  - textbooks
  - notes
  - manual
  - textbooks

UNIT V

- 4 **A. PLANT DEVELOPMENT & PRIMARY GROWTH:**  
Importance of Primary Growth in Roots and Stems (L-9)  
Growth of Leaves & Branches  
Leaf Coloration in Fall
- 8 **B. SECONDARY GROWTH IN PLANTS:**  
Importance in Woody Plants (L-10)  
Development of Secondary Tissue and "Wood"  
Wood Structure: (L-11)
  - hardwoods vs softwoods
  - ring porous vs diffuse hardwoods
- notes
  - manual
  - textbooks
  - notes
  - manual
  - textbooks

UNIT VI

- 4 **NUTRITION OF PLANTS:**  
Cell Membranes & Material Movement  
Transport of Water & Food through Plant  
Cells & Tissues (L-13)
- notes
  - manual
  - textbooks

UNIT III STRUCTURE OF AN ECOSYSTEM

- On completion of this unit, the student will be able to:
1. Illustrate the differences between food chains, webs and pyramids, using common examples 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.

BIOLOGY/ECOLOGY - PERFORMANCE OBJECTIVES

UNIT VI

**UNIT 1 - BACKGROUND OF BIOLOGY**

**ENABLING OBJECTIVES**

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. 2965.01
2. State eight characteristics that all living things possess. 2970.01
3. Demonstrate by means of a flow chart how many biological problems may be solved employing the scientific method. 2965.01  
2965.03
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. 2968.02

**UNIT II - 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. 2968.02
2. Illustrate by means of summary diagrams and charts the processes of photosynthesis and respiration, and their interrelationships. 2968.02
3. Draw a sketch of the fixed energy cycle to summarize the steps of energy flow.

**UNIT III STRUCTURE OF AN ECOSYSTEM**

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

1. Illustrate the differences between food chains, webs and pyramids, using common examples at each trophic level.
2. Draw a graph or tolerance curve to show how environmental factors affect growth or development. 2970.04
3. State various adaptations any common plant or animal has to overcome these environmental influences. 2968.10

UNIT III (Continued)

4. Describe the effect one species or population has on another using the titles: parasitism; disease; predation; amensalism; commensalism; competition. 2968.02
5. 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. 2967.04  
2970.01
6. Illustrate by means of a sketch of a continuum index how the principle of edges and ecotones are significant. 2968.10
7. Define and differentiate between the niche and habitat of a forest species. 2968.10
8. Describe the importance of stratification in a forest, giving valid examples.
9. Prepare a report on the nature of succession and outline stage-by-stage the progression observed in aquatic and terrestrial ecosystems. 2970.01

**UNIT IV - 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. 2970.01
2. Describe the major types of plant tissues and cells, and how they differ from their animal counterparts. 2967.04

**UNIT V - 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: 2970.01
  - 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

UNIT V (Continued)

- b. Secondary growth of woody dicots - root or stem 2967.04
  - 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 VI - 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. 2968.02
- 2. Trace the intake and movement of any nutrient into and through a plant or animal, and indicate forces involved. 2968.02

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LABORATORY MANUAL

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.

ATTENDANCE is compulsory.

SCIENTIFIC WORDS must be spelled correctly. One-half mark will be taken off for incorrectly spelled words.

MANUAL - bring to each lab. Read textbook and lab manual prior to each lab period.

LAB DRAWINGS - use only plain bond paper, one side only. All drawings will be done with a 3H pencil. All lettering will be freehand. Staple pages together. (See guide for lab drawings)

SUBMISSION OF LAB DRAWINGS

1. All lab drawings must be completed before the end of the lab period.

2. Drawings may be requested at any time:

- at the end of a lab
- next week, or at any later lab
- Keep all completed labs in your notebook, and bring to each class

3. Any labs requested to be handed in will be marked out of 10. Labs not received when requested will receive a 0.

4. Lab drawings are part of the course material and could be on a test.

5. Not all labs will be requested for marking. Labs not requested will be discussed in class to allow students to correct and complete drawings.

6. Some labs will be marked using other procedures; e.g., a quiz may be inspected and checked as completed.

7. All missed labs must be completed within one week.

BIO 114-3

LABORATORY MANUAL

SUGGESTED READING

GENERAL INFORMATION

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MANUAL - bring to each lab. Read textbook and lab manual prior to each lab period.

LAB DRAWINGS - use only plain bond paper, one side only. All drawings will be done with a 2H pencil. All lettering will be freehand. Staple pages together. (See guide for lab drawings)

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