

BIO 114-3

BIOLOGY/ECOLOGY

CODE NUMBER

COURSE NAME

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

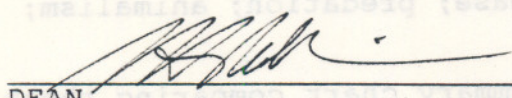
COURSE TITLE: BIOLOGY/ECOLOGY

CODE NO.: BIO 114-3 SEMESTER: III

PROGRAM: FORESTRY TECHNICIAN

AUTHOR: G.L. STONE

DATE: SEPTEMBER 1990 PREVIOUS OUTLINE DATED: JULY 1988

APPROVED:  DEAN DATE: Sept 4/90

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TOTAL CREDIT HOURS: 48

PREREQUISITE(S): SCI115

I. 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.

II. STUDENT PERFORMANCE OBJECTIVES:

1. Distinguish between the science of Biology and Ecology by using correct definitions.
2. Draw a chart placing any component of the levels of organization of matter in correct relationship to all others in the hierarchy.
3. Illustrate the differences between food chains, webs and pyramids, using common examples at each trophic level.
4. Draw a graph or tolerance curve to show how environmental factors affect growth or development.
5. State various adaptations any common plant or animal has to overcome these environmental influences.
6. Describe the effect one species or population has on another using the titles: parasitism; disease; predation; animalism; commensalism; competition.
7. 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.
8. Illustrate in a report by means of a continuum index how the principle of edges and ecotones are significant.
9. Define and differentiate between the niche and habitat of a forest species.

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II. STUDENT PERFORMANCE OBJECTIVES: (cont'd)

10. Describe the importance of stratification in a forest, giving valid examples.
11. Prepare a report to describe the nature of succession and outline stage-by-stage the progression observed in aquatic and terrestrial ecosystems:
 - a) bare rock to forest
 - b) bare soil to woodlot
 - c) pond to boreal forest.
12. Describe the major types of plant tissues and cells, and how they differ from their animal counterparts.
13. Illustrate or identify from a sketch the following plant growth regions, cells, and tissues:
 - a. Primary growth of 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
14. Write down in concise form a description of the development and functions of tissues above.
15. Compare wood structures/both hardwoods and softwoods.

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III. TOPICS TO BE COVERED:

1. Ecology - Definition
Levels of organization (review)
Structure of an Ecosystem
2. Trophic levels (slide set)
Food chains
Food webs
3. Pyramids
Habitats and Niches
4. Physical / Abiotic Factors
Nutrients & their Cycles
Importance
5. Climatic Factors
Temperature & Adaptation
6. Moisture & Adaptation
7. Wind
Light - photoperiod
Soil
Topography
8. Living Environmental Factors
Predation
Parasites/Disease
9. Competition - types & effects
Symbiosis
10. Ecosystem Characteristics
Dominance
Species Diversity
Principle of Edges (Ecotones)
11. Stratification in Communities & Ecosystems
Succession (Ecosystem development)
Terrestrial Succession
 Natural or primary succession
 Secondary succession - after fire
 after logging
 Heterotrophic succession

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

12. Aquatic Succession
13. Population dynamics
External factors Affecting Populations
Law of Tolerance
Law of Minimum
Competition
14. Intrinsic Factors Affecting Populations
Growth Curves for Populations
Carrying Capacity
15. Cell structure review
Plant cells comp'd to animal
16. Specialized plant cells
Parenchyma, collerchyma, sclerenchyma etc.
17. Specialized plant tissues
Xylem, phloem, Epidermis,
Cambium cork
18. Plants - Primary growth of stems, roots
19. Plants - Growth of Branches, leaves
Leaf structure
Leaf Colouration & fall
20. Plants - Secondary growth
21. Wood structure
- Components - Hw vs. Sw
- Ringporous vs. diffuse porous hardwoods

Ecology Labs -

1. Continuum: How do communities change and overlap (ecotones) in the college woodlot?
2. Succession from bare soil to woodlot.
3. Primary succession from pond to boreal forest.
4. Primary succession from bare rock.

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TOPICS TO BE COVERED: (cont'd)

Biology Labs -

1. Unspecialized plant cells
2. Specialized plant cells.
3. Specialized plant tissues.
4. Primary growth - roots, stems.
5. Secondary growth - roots, stems.
6. Twig parts & leaf cross-section.
7. Wood structure.



IV. EVALUATION METHODS:

Final marks will be based on:

- Four term tests - 40%
- Four reports - 40%
- Labs - 20%

Grading:

- A+ - 90%
- A - 80%
- B - 70%
- C - 60%

V. REQUIRED STUDENT RESOURCES:

Copy of this course outline.

"Investigating Terrestrial Ecosystems" by William A. Andrews

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.