

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

<b>COURSE TITLE:</b>	<b>ECOLOGY</b>		
<b>CODE NO. :</b>	<b>NRT109</b>	<b>SEMESTER:</b>	<b>II</b>
<b>PROGRAM:</b>	<b>FORESTRY, FISH &amp; WILDLIFE, PARKS &amp; OUTDOOR RECREATION, AND ABORIGINAL RESOURCE TECHNICIAN</b>		
<b>AUTHOR:</b>	<b>Jerry A. Zuchlinski, M.Sc.</b>		
<b>DATE:</b>	<b>Nov. 2006</b>	<b>PREVIOUS OUTLINE DATED:</b>	<b>Sept 2005</b>
<b>APPROVED:</b>	_____		_____
	DEAN		DATE
<b>TOTAL CREDITS:</b>	<b>3</b>		
<b>PREREQUISITE(S):</b>	<b>None</b>		
<b>HOURS/WEEK:</b>	<b>3 Hours X 16 Weeks</b>		

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*For additional information, please contact C. Kirkwood, Dean  
School of Technology, Skilled Trades, Natural Resources & Business  
(705) 759-2554, Ext.2688*

**I. COURSE DESCRIPTION:**

This is an introductory course to provide students with an understanding of ecology as it relates to the field of natural resources. The course covers a wide range of topics that examine the interactions between plants and animals and their physical environment. A combination of lectures, labs and field surveys provide insight into the structure and function of ecosystems in general; but emphasize forest and freshwater ecosystems in Canada

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. Identify the 6 attributes of an ecosystem and describe their implications
  - Potential Elements of the Performance:
  - Distinguish between biotic and abiotic components of an ecosystem
  - Describe trophic relationships between autotrophs, heterotrophs, and decomposers in energy transfer and material movement
  - Distinguish between microconsumers and macroconsumers
  - Identify the 3 major abiotic components of ecosystems and their contribution to ecosystem function; including inorganic material, organic material and climatic factors
  - Demonstrate an understanding of complexity, interaction and interdependence, lack of spatial dimension and ecosystem dynamics as they relate to ecosystem structure and function

2. Describe the role of bacteria as they relate to the structure and function of ecosystems

Potential Elements of the Performance:

- Describe key characteristics of bacteria
- Demonstrate techniques for the identification of bacteria including gram staining, culture of agar plates and microscopic examination of colony characteristics
- Discuss the importance of various groups of bacteria in relation to decomposition, nutrient cycling, as pathogens and as chemo and photoautotrophs

3. Demonstrate the significance of ecological energetics

Potential Elements of the Performance:

- Describe biotic and abiotic sources of energy
- Distinguish between and provide examples of food webs, food chains, and ecological pyramids
- Describe the ecological relationship between photosynthesis and respiration
- Classify organisms by trophic function
- Distinguish between gross, primary, net and secondary productivity

4. Discuss the role of major abiotic factors in natural ecosystems

Potential Elements of the Performance:

- Describe characteristics of light and their relationship to organisms
- Provide examples of positive and negative influences of: temperature, photoperiod, solar radiation, humidity, precipitation, wind, soils, fire and topography
- Demonstrate how insects use heat accumulation information to break diapause
- Be able to calculate degree day values
- Distinguish between and provide examples of geochemical and biogeochemical cycling
- Briefly describe the major steps in the following nutrient cycles: nitrogen, carbon and hydrological
- Identify symptoms of deficiency and /or excess of each macronutrient
- Demonstrate the effect of various deficiencies through a lab analysis of plants grown in nutrient deficient environments

5. Apply the concepts of ecological tolerance, niche and habitat

Potential Elements of the Performance:

- Define niche and habitat
- Demonstrate the effect of ecological tolerance limits in relation to range and distribution
- Provide examples of terrestrial and aquatic habitat variation and how organisms adapt to occupy specific niches

- Describe adaptive strategies to avoid niche overlap
- Describe the niche, habitat, range and distribution of select species

6.

Discuss various general characteristics of populations

Potential Elements of the Performance:

- Differentiate between the following symbiotic relationships: predation, parasitism, mutualism, commensalism and disease and provide examples
- Differentiate between interspecific and intraspecific competition and provide examples
- Explain the carrying capacity concept

7. Discuss characteristics of community structure and species interaction

Potential Elements of the Performance:

- Provide examples of community stratification in terrestrial and aquatic ecosystems
- Distinguish between vertical and horizontal stratification and discuss their significance in biodiversification
- Explain the evaluation of biodiversity at the species, community and landscape level
- Describe ecological characteristics of ecotones
- Describe the ecological relationships between terrestrial and aquatic interfaces
- Describe the stages of ecological succession using various examples
- Distinguish between primary and secondary succession
- Describe how communities respond to disturbance such as wind, fire, timber harvesting, flooding, disease and erosion

Conduct an ecological survey of a forest community including: vertical stratification, community composition, habitat values and successional series

### III. TOPICS:

1. The scope of ecology
2. Ecosystem characteristics
3. Trophic relationships and ecological energetics

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4. Abiotic influences in ecosystems
5. Ecological characteristics of species
6. Characteristics Ecological of populations
7. Community structure
8. Community succession
9. Biodiversity

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

Zuchlinski, J.A. 2006. Ecology Lab Manual  
Zuchlinski, J.A. 2006. Ecology Study Guide

**V. EVALUATION PROCESS/GRADING SYSTEM:**

Mid-term Test	- 20%
Final Test	- 20%
Assignments	-10%
Lab Reports	<u>-50%</u>
<u>TOTAL</u>	100%

A total of 5 lab projects will be conducted over the course of the semester.

Labs will be evaluated on the basis of neatness, accuracy, thoroughness and appropriate use of computer software.

Late submissions of lab and assignments will have their values reduced at a rate of 10% per day for a period of 5 days after the due date. After 5 days the lab will be evaluated as a zero. All labs must be submitted regardless of grade to pass the course.

No opportunities for an end of semester re-writes will be available.

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical	

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U	placement or non-graded subject area. Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

### Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

### Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

### Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

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#### **VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

#### **VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.