

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** Ecology

**CODE NO. :** NRT109 **SEMESTER:** 2

**PROGRAM:** Fish & Wildlife Conservation, Adventure Recreation and Parks, Forest Conservation Technician, Natural Environment Technician and Natural Environment Technologist.

**AUTHOR:** J. Zuchlinski, M.Sc. (Updated by E. Muto/C. Marcinkowski)

**DATE:** Dec 2015 **PREVIOUS OUTLINE DATED:** May 2014

**APPROVED:** Colin Kirkwood Dec 2015

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**TOTAL CREDITS:** 3

**PREREQUISITE(S):** None

**HOURS/WEEK:** 3

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**For additional information, please contact Colin Kirkwood, Dean**  
**School of Environment, Technology & 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 natural environments. The course covers a wide range of topics that examine the interactions between organisms 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
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 to determine vertical stratification and community composition

**III. TOPICS:**

1. The scope of ecology
2. Ecosystem characteristics
3. Trophic relationships and ecological energetics
4. Abiotic influences in ecosystems
5. Ecological characteristics of species
6. Ecological characteristics of populations
7. Community structure
8. Community succession
9. Biodiversity

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

Zuchlinski, J.A. 2014. Ecology Lab Manual  
Zuchlinski, J.A. 2014. Ecology Study Guide

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

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

NOTE: Labs are an essential component of this course. As such, failure to attend any lab without suitable reason and without reasonable notification will result in a 5% deduction from your final mark for each lab missed. As an example, if you have a final mark of 75% and you missed 2 labs the final mark will be downgraded to 65%,

The following semester grades will be assigned to students:

<b>Grade</b>	<b>Definition</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 placement or non-graded subject area.	
U	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.	

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student

wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

#### **VI. SPECIAL NOTES:**

##### Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

#### **VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.