COURSE OUTLINE: NRT109 - ECOLOGY

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Course Code: Title	NRT109: ECOLOGY
Program Number: Name	5212: ADVENTURE RECREATION 5214: FISH/WILD CONSERVATN 5220: NAT ENVIRONMENT TN 5230: FORESTRY TECHNICIAN
Department:	NATURAL RESOURCES PRG
Academic Year:	2024-2025
Course Description:	This is an introductory course to provide students with an understanding of ecology as it relates to people who work with renewable 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 aquatic ecosystems in Canada.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**5212 - ADVENTURE RECREATION** VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills. VLO 7 Describe the scientific method and how it shapes our understanding of the ecology of the natural world. VLO 8 Demonstrate an understanding of sustainable development and apply the foundations in the natural environment. VLO 10 Evaluate and apply current technologies and mathematical concepts used to collect, manage and analyze data. VLO 11 Analyze, evaluate and apply subjective and objective safety considerations for Adventure Recreation and Parks activities. **5214 - FISH/WILD CONSERVATN** VLO 1 Demonstrate clear, concise and industry appropriate written, spoken and visual communication skills VLO 3 Demonstrate the ability to follow standardized protocols to collect field data on fish and wildlife populations in a variety of weather and site conditions. VLO 4 Demonstrate the correct use of standard laboratory equipment and skills required to carry out experiments and study various organisms.

VLO 7 Recognize the contributions and applications of various science disciplines in the understanding of natural environments.

VLO 8 Demonstrate an understanding of sustainable development and apply these principles to the natural environment.

VLO 10 Evaluate and apply current technologies and mathematical concepts used to collect, manage and analyze data.

VLO 11 Analyze, evaluate and apply subjective and objective safety considerations.

5220 - NAT ENVIRONMENT TN

VLO 1 Collect data from representative biological and environmental samples using routine test procedures.

VLO 2 Utilize natural resources equipment and technology to accurately identify ecosystem components for purposes of conserving and managing natural resources.

VLO 3 Apply the basic concepts of science to natural resource conservation and management.

VLO 4 Conduct natural environment assessments according to standard field survey methods, including the use of appropriate equipment and materials.

VLO 6 Practice principles and ethics associated with natural resource conservation and management issues.

VLO 7 Work safely in adherence to occupational health and safety standards.

VLO 10 Perform basic project management support techniques.

VLO 11 Communicate technical information accurately and effectively in oral, written and visual forms.

5230 - FORESTRY TECHNICIAN

VLO 1 Conduct forest inventory surveys and field measurements to determine forest resources and values in forests and woodlots.

VLO 2 Assess soil characteristics, vegetation and wildlife habitats to identify their interactions within forest ecosystems.

VLO 8 Work independently and in a collaborative environment while applying effective teamwork, leadership and interpersonal skills.

VLO 9 Communicate technical information to a variety of stakeholders in oral, written, visual and electronic forms.

Essential Employability Skills (EES) addressed in this course:

EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.

EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.

EES 4 Apply a systematic approach to solve problems.

EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.

EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.

EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.

	EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Academic success is directly linked to attendance. Missing more than 1/3 of the course hours in a semester shall result in an `F` grade for the course.

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1. Identify the 6 attributes of an ecosystem and describe their implications.	1.1 Distinguish between biotic and abiotic components of an ecosystem. 1.2 Describe trophic relationships between autotrophs, heterotrophs, and decomposers in energy transfer and material movement. 1.3 Distinguish between microconsumers and macroconsumers. 1.4 Identify the 3 major abiotic components of ecosystems and their contribution to ecosystem function, including inorganic material, organic material and climatic factors. 1.5 Demonstrate an understanding of complexity, interaction and interdependence, lack of spatial dimension and ecosystem dynamics as they relate to ecosystem structure and function.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Describe the role of bacteria as they relate to the structure and function of ecosystems.	2.1 Describe key characteristics of bacteria. 2.2 Describe techniques for the identification of bacteria including gram staining, culture of agar plates and microscopic examination of colony characteristics. 2.3 Discuss the importance of various groups of bacteria in relation to decomposition, nutrient cycling, as pathogens and as chemo and photoautotrophs.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Demonstrate the significance of ecological energetics.	3.1 Describe biotic and abiotic sources of energy. 3.2 Distinguish between and provide examples of food webs, food chains, and ecological pyramids. 3.3 Describe the ecological relationship between photosynthesis and respiration. 3.4 Classify organisms by trophic function. 3.5 Distinguish between gross, primary, net and secondary productivity.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Discuss the role of major abiotic factors in natural ecosystems.	4.1 Describe characteristics of light and their relationship to organisms. 4.2 Provide examples of positive and negative influences of: temperature, photoperiod, solar radiation, humidity,

	precipitation, wind, soils, fire and topography. 4.3 Describe how insects use temperature cues to carry out life processes. 4.4 Understand the utility of calculating degree day values. 4.5 Distinguish between and provide examples of geochemical and biogeochemical cycling. 4.6 Briefly describe the major steps in the following nutrient cycles: nitrogen, carbon & hydrological. 4.7 Identify symptoms of deficiency and/or excess of each macronutrient.
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. Apply the concepts of ecological tolerance, niche and habitat.	5.1 Define niche and habitat. 5.2 Demonstrate the effect of ecological tolerance limits in relation to range and distribution. 5.3 Provide examples of terrestrial and aquatic habitat variation and how organisms adapt to occupy specific niches. 5.4 Describe adaptive strategies to avoid niche overlap. 5.5 Describe the niche, habitat, range and distribution of select species.
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Discuss various general characteristics of populations.	6.1 Differentiate between the following symbiotic relationships: predation, parasitism, mutualism, commensalism and disease and provide examples. 6.2 Differentiate between interspecific and intraspecific competition and provide examples. 6.3 Explain the carrying capacity concept.
Course Outcome 7	**Learning Objectives for Course Outcome 7**
7. Discuss characteristics of community structure and species interaction.	7.1 Provide examples of community stratification in terrestrial and aquatic ecosystems. 7.2 Distinguish between vertical and horizontal stratification and discuss their significance in biodiversification. 7.3 Explain the evaluation of biodiversity at the species, community and landscape level. 7.4 Describe ecological characteristics of ecotones. 7.5 Describe the ecological relationships between terrestrial and aquatic interfaces. 7.6 Describe the stages of ecological succession using various examples. 7.7 Distinguish between primary and secondary succession. 7.8 Describe how communities respond to disturbance such as wind, fire, timber harvesting, flooding, disease and erosion. 7.9 Conduct an ecological survey of a forest community to determine vertical stratification and community composition.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	10%
Lab Reports	40%

	Lab/Field Activities	20%
	Tests	30%
Date:	June 21, 2024	
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.	