INTRODUCTORY ECOLOGY
BIOLOGY 2210
ENVIRONMENTAL STUDIES 2210

Course Outline 2024 Fall

BIOL 2210FAO

"If it dies, it's biology; if it blows up, it's chemistry; if it doesn't work, it's physics."

John Wilkes

"*The question is not what you look at, but what you see*."

Henry David Thoreau

"...you don't know what you got till it's gone.
They paved paradise and put up a parking lot."

Joni Mitchell

"If you don't have time to do it right the first time,
When are you going to have time to do it again?"

Anonymous

"Natural selection has, through all its long history, shown a might y open-mindedness toward any idea that works."

Robert Ardrey

Lakehead
UNIVERSITY

Introduction

Ecology is an old science. It concerns the study of individual species of plants and animals, and assemblages of organisms, interacting with their biotic and abiotic environments. In Ecology 2210, the emphasis has been placed on the concept of the ecosystem as the basic unit within the biosphere and the fundamental idea of the non-cyclical flow of energy and the recycling of materials within ecosystems. Implicit in any ecological study is the interrelatedness of living things.

In this course, we shall explore the biotic components of ecosystems (traditionally the plants and animals) with respect to species adaption to local environments, methods of dispersal, population structure, and interaction at the community level of organization. Additionally, we will examine the interactions of floral and faunal communities with the physical environments in which they occur.

The topics in lab will echo many of those presented in lecture and give you an introduction to some of the techniques by which we can gain knowledge in ecology. It is hoped that by introducing you to the fundamentals of ecology -- whether you are interested in ecology as a profession or simply as a subject of concern -- you will be better prepared to soundly evaluate the many choices which the future holds.

The following excerpt from "Looking Ahead: a Strategy for Ontario" (OMNR Wildlife Working Group 1991) neatly summarizes the concept of an ecosystem:

> ***AN ECOSYSTEM:*** *is a network of living things (such as plants and animals, including humans) and non-living components of their environment (such as air, soil and water), interacting with each other and with other ecosystems. Most ecosystems are powered by solar energy and bound together through a network of food chains: green plants use solar energy to manufacture organic substances from carbon dioxide in air, from the water, and from nutrients in the soil; plants, in turn, support populations of herbivores which, in turn, provide food for carnivores. And when an organism dies its body is recycled by decomposer organisms such as bacteria and fungi.*
>
> *The concept of linkages and interactions in ecosystems can be applied at many levels. The largest is the ecosphere, the thin layer at the surface of the earth in which life is possible. At the other extreme are the interactions in a small pond, in a rotting log, or in a garden. Lying between these extremes are the large regional landscapes, which may include many identifiable ecosystems, all working the same way: driven by finite amounts of sunlight and constantly recycling material and transferring energy in food webs. This is the productive machine that supports the diversity of wildlife in Ontario. Ecosystems are dynamic, constantly changing on local scales, while providing each species with its unique life requirements within a series of progressively larger ecosystems.*

Who?

Lectures: Dr. Nanda Kanavillil: nkanavil@lakeheadu.ca Office Room: OA 3009
Labs: Dr. Victoria TeBrugge vtebrug@lakeheadu.ca Office Room: OA 3003

What?

Required Text: Rick Relyea 2021
Ecology: The Economy of Nature, Ninth Edition.
W.H. Freeman and Company, New York NY.
(ISBN-13:978-1-319-36934-7)

Mark Allocation:

Labs:	35%
Lectures:	
Fall break: Monday October 14 - Friday October 18 (No classes)	
Midterm Exam: 80 mins **(October 09) Chapters 1-8 (**from 8.30 am to 9.50 am**)**	20%
Final Exam: 120 min (for date and time see LU exam timetable) **chapters 9-22**	25%
Class quizzes (four announced quizzes 5% each) (Take best three)	15%
Written assignment	5%
Lecture total	65%
Lecture + Labs	100 %

Where and When?

Lectures: Monday and Wednesday: 8.30 am – 10.00 pm (**OA 2008 - In person**)

Labs: Friday: 8.30am to11.30am (**OA 3002 - in person**)

Office hrs: Tuesday and Thursday 10.00 am – 11.30 am

2019 Lecture Outline (Subject to change)

< Chapter 1 An introduction to Ecology

PART I LIFE AND THE PHYSICAL ENVIRONMENT
< Chapter 2 Climates and Biomes
< Chapter 3 Challenges of living in Aquatic Environments
< Chapter 4 Challenges of living in Terrestrial Environments
< Chapter 5 Adaptations to Variable Environments
<
PART II ORGANISMS
< Chapter 6 Evolutionary Ecology
< Chapter 7 Life Histories
< Chapter 8 Reproductive strategies
< Chapter 9 Social behaviours
<
PART III POPULATIONS
< Chapter 10 Population distributions
< Chapter 11 Population Growth and Regulation
< Chapter 12 Population dynamics over time and space
<
PART IV SPECIES INTERACTIONS
< Chapter 13 Predation and herbivory
< Chapter 14 Parasitism and infectious disease
< Chapter 15 Competition
< Chapter 16 Mutualism

PART V COMMUNITIES AND ECOSYSTEMS
Chapter 17 Community structure
< Chapter 18 Community succession
< Chapter 19 Movement of energy in ecosystems
< Chapter 20 Movement of elements in ecosystems

PART VI GLOBAL ECOLOGY
< Chapter 21 Landscape Ecology, Biogeography and Global biodiversity
< Chapter 22 Conservation of Global Biodiversity

Quizzes (Subject to change)

Each quiz will be multiple choices or fill in the blanks type. Each quiz will cover two previous lectures taught in the previous week from the date of the quiz (will be communicated to you by the instructor). Altogether there will be four quizzes of which the best three marks will be counted for the final grade calculation. Generally the quizzes (online) will open up at the beginning of the class and will be for a duration of 15 min. The dates of the quizzes are:

Quiz 1 - Sept 18 (from 8.30 am to 8.45 am)
Quiz 2 - Oct 02 (from 8.30 am to 8.45 am)
Quiz 3 - Nov 06 (from 8.30 am to 8.45 am)
Quiz 4 - Nov 20 (from 8.30 am to 8.45 am)

Written assignment:

A **one page written assignment** on any ecological topic to be selected and communicated to the instructor no later than October 31st is to be submitted via email to the instructor (nkanavil@lakeheadu.ca) by November, 29. Late submissions will lose marks: 2% for one day late submission, 4% for 2 days late submission and submission after 3 days will lose the entire 5%.

The **one page** write-up should have at least 3 references (**from refereed journal papers**) with full citation in APA format given at the end (on the second page) of the assignment. The last paragraph should be the synthesis of the topic and your suggestions for future. A rubric for the written assignment will be posted at the course site.

Format and style: One page with references on the second page. **12 point font (Time New Roman) with 1.5 line space. References are to be listed in APA format (**https://apastyle.apa.org/style-grammar-guidelines/paper-format/sample-papers)
Not following the format will result in losing marks.

The assignment will be strictly scrutinized for plagiarism. If plagiarism (such as copy pasting, paraphrasing, adopting figures, tables and ideas etc. from other sources without proper citation) is detected or the text is prepared by AI assisted text, a grade zero will be given to the assignment. Please see the following link for the academic dishonesty guidelines and code of student behaviour and disciplinary procedures of Lakehead University:

Academic Dishonesty

Plagiarism in any form including AI assisted text generation is an extremely serious academic offense and carries penalties varying from failure in an assignment to expulsion from the university. Students are encouraged to review the following link of the University Regulations regarding academic dishonesty.

A listing of University Regulations can be found at:
http://calendar.lakeheadu.ca/current/contents/regulations/univregsintro.html

The code of student behaviour and disciplinary procedures can be found at:
http://policies.lakeheadu.ca/policy.php?pid=60

If anyone needed additional information, please obtain a copy of the "Code of Student Behaviour and Disciplinary Procedures" from the Registrar's Office.

Why?

Whether you are a history major, an outdoor recreation specialist, a nature lover or a pre-med student, we hope you will learn to appreciate the natural world around you in this Introductory Ecology course. You may not be thinking of a career in this field but everyone at one time or other will take a walk "in the bush", except now you will know a few of the plants you see and which invertebrates are squishing through your toes in the stream and you will know how the studies were done that closed down your favourite fishing spot and how a skinny little mouse can survive -30^{o}C temperatures better than you.

Isn't it important for all of us to know that plants and animals and their surrounding environment all interact together so nothing stands alone? Each has their own special importance in the big picture just as we do in our everyday lives.