

**BI 110**  
**Ecology and Field Biology**

**3 Credits**

Instructor: Jennifer McGuinness

780 853 8643

Original Developer: Keith Baker

Current Developer: Jennifer McGuinness

Reviewer: Robin Lagroix-McLean

Created: 01/05/1997

Revised: 06/05/2019

Approval: 05/06/2019

The Implementation Date for this Outline is 01/09/2019

Copyright©LAKELAND COLLEGE. Email: [admissions@lakelandcollege.ca](mailto:admissions@lakelandcollege.ca)  
2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700  
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400  
Toll-free in Canada: 1 800 661 6490



## BI 110 Version: 24



# Ecology and Field Biology

## Calendar Description

This course introduces fundamental ecological principles and concepts. Interactions between organisms and their environments are emphasized throughout. Major themes include: the physical environment, natural selection, plant and animal adaptations, population dynamics, predator-prey systems, co evolutionary interactions, population genetics, and ecosystem productivity. Time is spent in the field studying biotic and abiotic relationships in local community types using standard ecological field methods.

## Rationale

This course is required for first year students within the Environmental Sciences diploma. A broad ecological background is fundamentally important to students studying any discipline in environmental biology. Graduating students need a basic understanding of ecological terms, relationships, and processes to work in their chosen field and to converse at a knowledgeable level with scientists in a variety of disciplines.

## Prerequisites

None

## Co-Requisites

None

## Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. use ecological terminology.
2. describe how organisms interact with their physical and biological environments.
3. describe the differences in the structure and function of different types of ecosystems.
4. explain the processes driving the distribution and abundance of organisms.
5. summarize ecological data and present ecological information in figures and tables.
6. write a scientific paper that emphasizes the scientific process.
7. find, evaluate, and use the scientific literature.

8. use proper field techniques for sampling plant and animal populations and collecting field data.
9. apply ecological concepts to solve environmental problems.
10. work together in teams.

## Essential Employability Skills

Essential employability skills are critical for workplace success and lifelong learning. Lakeland College prepares its graduates for the workplace and lifelong learning by integrating and promoting essential employability skills development in its curricula. Each credit course offered at Lakeland College emphasizes one or more of the following five essential employability skills:

- A. **Communication Skills** that enable individuals to listen, interpret, express, and convey knowledge and ideas so that they are received and understood.
- B. **Teamwork Skills** that enable individuals to respect the thoughts and opinions of others as they work together to plan activities, meet deadlines, complete projects, and contribute to an organization's goals.
- C. **Critical Thinking Skills** that enable individuals to conceptualize and analyze issues from various perspectives while rationally evaluating the strengths and limitations of each perspective and deciding what action to take.
- D. **Adaptability Skills** that enable individuals to respond quickly, willingly, and positively to new conditions and changing times.
- E. **Positive Attitude and Behavioural Skills** that enable individuals to be confident about themselves and to deal with people, problems, and situations with honesty, integrity, and personal ethics.

## Resource Materials

### *Required Texts:*

Erichsen Arychuk, C. 2015. BI 110 Ecology and field biology lecture supplement.

Lakeland College.

Erichsen Arychuk, C. 2015. BI 110 Ecology and field biology laboratory manual.

Lakeland College.

### *Recommended Texts:*

Pattie, D., and C. Fisher. 1999. Mammals of Alberta. Lone Pine, Edmonton, AB.

Johnson, D., L. Kershaw, A. MacKinnon, and J. Pojar. 2009. Plants of the western forest: Boreal and Aspen Parkland. Lone Pine and Canadian Forest Service, Edmonton, AB.

Knisely, K. 2013. A student handbook for writing in Biology. Sinauer Associates Inc.

Sibley, D.A. 2003. The sibley field Guide to birds of Western North America. Knopf.

Smith, T.M., R. L. Smith., and I. Waters. 2014. Elements of Ecology. Pearson Canada Inc.

## **Conduct of Course**

This course consists of approximately 42 hours of lecture and 28 hours of lab.

The lecture is a formalized classroom situation where the instructor discusses pertinent topics and students normally take notes. Students are encouraged to participate in class discussion and to ask questions to clarify subject areas. The lectures concentrate on ecological terminology and relationships.

The laboratory component is conducted in the field. Students will use a variety of sampling and census techniques to study the ecological attributes of a variety local community and habitat types. Labs are held regardless of weather, and, therefore, students must be prepared for inclement conditions.

## **Evaluation Procedures**

The final grade is an aggregate of the following components:

Lecture Midterm Examination	20%
Lecture Final Examination (cumulative)	30%
Laboratory Quizzes	10%
Laboratory Assignments	15%
Laboratory Technical Paper	10%
Laboratory Exam	<u>15%</u>
Total:	100%

To obtain credit for this course:

- All lab reports and projects must be completed and handed in.
- All lab activities must be attended.
- Students who are absent during in-class assignments and quizzes will not typically be allowed to make up these exercises for marks, but may be required to complete them for learning practice.
- A minimum grade point of D (50%) is required.
- Note: Late lab reports and projects must still be submitted however, are not graded and a mark of 0 is assigned.

## Knowledge/Skills Matrix

Students apply and demonstrate their knowledge and skills to use

### A. Communication Skills

<b>A1. by listening, reading, interpreting information, and communicating effectively</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1, 2, 3, 4; Final/Goals 1, 2, 3, 4; Lab Exercises/Goals 1, 2, 3, 5, 6, 7, 8, 9, 10
<b>A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 1, 2, 3, 4, 5, 6
<b>A3. by using libraries, Internet, technical publications, journals and other sources to find pertinent information</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 1, 2, 3, 4, 6, 7

### B. Teamwork Skills

<b>B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 8, 9, 10
<b>B2. by using interpersonal skills to resolve conflict, relate to others, and assist others</b>
<b>Evaluation(s)/Goal(s):</b> NA
<b>B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 8, 9, 10
<b>B4. by treating other members of the group open-mindedly and fairly</b>
<b>Evaluation(s)/Goal(s):</b> Goals 8, 10
<b>B5. by developing tactics/strategies to accomplish tasks</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 8, 9, 10

### C. Critical Thinking Skills

<b>C1. by seeing critical thinking as a lifelong process of self-assessment</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 5, 6, 7, 8, 9
<b>C2. by examining problems closely</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 5, 6, 7, 8, 9
<b>C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 6, 7
<b>C4. by seeking out the truth</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 6, 7
<b>C5. by finding solutions; make decisions</b>
<b>Evaluation(s)/Goal(s):</b> NA
<b>C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 4, 6, 7, 9
<b>C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 2, 3, 4; Final/Goals 2, 3, 4; Lab Exercises/Goals 2, 3, 6, 7

**D. Adaptability Skills**

<b>D1. by working independently or as part of team</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1, 2, 3, 4; Final/Goals 1, 2, 3, 4; Lab Exercises/Goals 1-10
<b>D2. by carrying out multiple tasks or projects</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 1-10
<b>D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goal 5, 8, 9
<b>D4. by being open and respond constructively to change and uncertainty</b>
<b>Evaluation(s)/Goal(s):</b> Assignments/Goal 8, 9, 10

**E. Positive Attitude and Behavioural Skills**

<b>E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1-4; Final/Goals 1-4; Lab Exercises/Goals 5-10
<b>E2. by showing interest, initiative, and effort</b>
<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1, 2, 3, 4; Final/Goals 1, 2, 3, 4; Lab Exercises/Goals 1-10
<b>E3. by affirming the need for positive solutions and encourage positive interaction and feedback</b>
<b>Evaluation(s)/Goal(s):</b> Lab Exercises/Goal 10
<b>E4. by balancing personal and family activities with job-related activities</b>
<b>Evaluation(s)/Goal(s):</b> NA

**Grade Equivalents and Course Pass Requirements**

*A minimum grade of D (50%) (1.00) is required to pass this course.*

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

**Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.**

**Attendance**

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports, therefore absenteeism is recorded.

- a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours can be required to withdraw and would then automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade).
- b. An excused absence is one that is verified with your instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the

absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another instructor regarding a field trip or other activity, or authorization by your instructor following an in-person meeting. Be sure to contact your instructor and ask what they will require from you as verification for each absence. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

### **Course Units/Topics**

The following is a chronological list of the material to be covered in the lectures:

1. Introduction to Ecology
  - a. Ecology: meaning and scope
  - b. Ecological scales of investigation
  - c. Ecological experimentation
2. The Ecosystem
  - a. Ecosystem productivity
3. The Physical Environment
  - a. Solar radiation and climate
  - b. Light, temperature, water, nutrients
4. The Community
  - a. Community structure
  - b. Community dynamics
5. The Organism and its Environment
  - a. Adaptation
  - b. Plant adaptations to the environment
  - c. Animal adaptation to the environment
  - d. Decomposition

6. Intraspecific Population Ecology
  - a. Properties of populations
  - b. Population growth
  - c. Intraspecific competition
  - d. Life history patterns
7. Population Interactions
  - a. Interspecific competition
  - b. Predators and their prey
  - c. Co evolutionary interactions: parasitism and mutualism
8. Ecological Genetics
  - a. Population genetics
  - b. Natural selection
9. Global Ecology
  - a. Human impacts

The following labs are conducted primarily in the field. They may not be conducted in the order listed on account of weather conditions.

<b>Grassland</b>	A survey of a grassland community introducing common sampling methods and experimental designs.
<b>Pond</b>	A contrast of the ecological processes and biodiversity of two pond ecosystems.
<b>Forest</b>	An in-depth look at plant, structural, and soil characteristics that distinguish two forests.
<b>River</b>	A survey of a riparian ecosystem and methods to describe aquatic habitats.
<b>Animal Populations and Sampling</b>	A contrast of the biotic and abiotic elements of animal habitats, including cover estimation, population density estimation and population change modeling.
<b>Biodiversity Monitoring</b>	A survey of data collection protocols used as part of a provincial Biodiversity Monitoring program.



Copyright©LAKELAND COLLEGE.  
2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700  
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400  
Toll-free in Canada: 1 800 661 6490 E-mail: [admissions@lakelandcollege.ca](mailto:admissions@lakelandcollege.ca)