Introduction to Ecology, Evolution, and Biodiversity (Biology 1051)

Course description: An introduction to fundamental evolutionary and ecological concepts with reference to biodiversity and the dynamics of species interactions. Emphasis will be placed on understanding the diversity of life, and the characteristics, behaviour, and classification of prokaryotes, unicellular eukaryotes, fungi, and multicellular plant and animal species. Lecture concepts are reinforced through hands-on exercises in laboratory sessions.

Professor: Dr. Janice M. Hughes
Email: janice.hughes@lakeheadu.ca

Zoom office hours: Wednesday at 10:00 am
Also Zoom office hours by appointment are available.
Contact me by email to arrange this.

Lab Technicians: Chase Moser
Email: cmoser@lakeheadu.ca

Matthew Quinn
Email: mquinn3@lakeheadu.ca

Lab Manual: *Exploring Biology in the Laboratory, 3rd edition* (Pendarvis), continuing from BIOL 1050F. No purchase necessary if you already have this book; otherwise, the cost is $148.75 from LU Bookstore. No other editions are suitable.

Optional Text: *Biology 2e* from OpenStax (Available free of charge on D2L or at https://openstax.org)

Learner Outcomes:

Upon satisfactory completion of this course, the student will be able to:

- Understand the fundamental concepts and underlying processes of evolution.
- Understand the basic principles of phylogenetics and classification.
- Categorize the diversity of major lineages of microbes, fungi, and protists, and understand the primary characteristics of each lineage.
- Categorize the diversity of major lineages of plants and understand the primary characteristics of each lineage.
- Categorize the diversity of major lineages of animals and understand the primary characteristics of each lineage.
- Remember the basic properties of populations and ecological interactions among different types of living organisms within ecosystems and biomes.
- Understand the importance of these biotic and abiotic interactions in ecosystem functioning and providing the services upon which all life exists.
- Understand the effects that humans have had on ecological systems and biodiversity and identify important remediation actions.

Marking Scheme: Lectures

There are two midterm tests that will be run online through the D2L course webpage. Additional instructions are posted on D2L under *Content->Outlines and Important Information*. The final exam is also online and will occur during the April exam period. The midterm tests and final exam are not cumulative.

Midterm 1	Unit 1 (Evolution) to 10 (Flowering Plants)	February 9	15%
Midterm 2	Unit 11 (Intro to Animals) to Unit 15 (Deuterostomes)	March 9	15%
Final Exam	Unit 16 (Fishes) to Unit 25 (Biodiversity/Conservation)	TBA	30%

Marking Scheme: Labs

Tests and Quizzes

1. There are two bell-ringer lab tests that occur during your regularly scheduled lab. The lab tests are not cumulative. It is important that you attend these exams at the designated time because you may not have an opportunity to write them at another date or time.

2. There are five lab quizzes that occur in-person during labs. See the lab schedule on page 6 for more details. Note that you must attend these lab quizzes in person because they will not be available to complete them at any other time.

If you are registered with Student Accessibility Services, please contact your lab technician, Chase or Matthew, at the email on page 1 prior to the first lab quiz for specific information on how you can receive your accommodations for the lab quizzes.

Assignments

1. There is a mini report to be completed based on an experimental lab activity that will be performed during the term. Experimental set-up occurs in Lab 2 and participation in the experimental procedures throughout the term is mandatory. More information regarding the format and content requirements of the mini report will be provided on D2L and during the labs.

Lab Test 1	Lab 1 (Evolution) to Lab 5 (Angiosperms)	Feb 13	10%
Lab Test 2	Lab 6 (Porifera, etc.) to Lab 10 (Ecology)	April 7	10%
Lab Quizzes	More information provided in labs	Various	10%
Mini Report	Topic to be announced	March 20	10%

Important Dates:

Labs start on January 9.
Study week occurs from Monday, February 16 to Friday, February 20.
The final exam will be held during the exam period from April 10 to 19.

Other Important Information:

Course delivery: The lectures for this course will be delivered remotely through Zoom. Attendance in the lectures is highly recommended because it will allow you to ask questions, provide comments, and interact with other students in the chat. You will not be required to turn your camera or microphone on during lectures. The labs will be delivered in-person.

Lecture recordings: Lecture recordings will be available after each lecture. The recordings are confidential and are intended for the use of registered students and instructors only. They may not be shared, viewed, or disclosed to anyone who is not registered in this course during the Winter 2026 term. To protect the privacy of others, please ensure that no one else is present in the room/area where you are located during recording. If this is a concern, make sure that your camera is off and that your microphone is muted during the lecture.

Lab equipment: You will require safety glasses and a lab coat for labs in which dissections will be performed. In addition, you will need a notebook for in-lab notes and assignments; a notebook with removable pages, such as spiral or 3-hole punch bound, may be most useful.

Accessibility: I am fully committed to providing all recommended accommodations for students with disabilities who are registered with Student Accessibility Services. Please feel free to make an appointment with me to discuss these options.

Final exams: I cannot reschedule a final exam so please wait until the exam schedule comes out in February before you plan any activities during the final exam period.

Absence due to Illness: If you miss a test or quiz due to illness, you must inform me by email within 24 hours of the scheduled test time; otherwise, you may not be able to write a make-up test. Athletes who will miss a midterm test due to competitions must provide a letter or email from their coach in advance that clearly shows the dates of their competitions. No other excuses (e.g., vacations, sleeping in, or non-university related activities) for missing tests will be accepted.

If you miss the final exam, you must follow the procedures outlined by Enrolment Services before a make-up exam can be rescheduled. More information can be found at *https://www.lakeheadu.ca/studentcentral/exams-grades/exam-central*.

Academic Dishonesty: Lakehead University takes academic dishonesty very seriously; this includes (but is not restricted to) cheating, plagiarism, impersonation, collaboration, and the use of generative AI on tests and exams. There is a zero-tolerance policy for any form of academic dishonesty in my courses, and penalties will be strictly enforced. If you are caught participating in academic dishonesty in this course, you will receive a grade of zero on the work. In addition, a formal report will be sent to the Dean of Sciences and Environmental Studies and the Office of Student Affairs, and documentation of the offense may be added to the Student Conduct Database and your permanent academic record.

You can find the university regulations regarding academic dishonesty here:
https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity

According to these regulations, any collaboration on online exams and quizzes is considered cheating. You must do the online tests alone with no help from friends, family, or classmates! The minimum penalty for collaboration or cheating is a mark of zero on the test. Not reading these instructions is not an excuse for not knowing them!

Use of AI Programs: The use of any AI programs (such as ChatGPT) on exams, quizzes, and assignments in this course is considered a breach of academic integrity and, as such, the minimum penalty will be a grade of zero on the work.

Generative artificial intelligence (Generative AI or GenAI) is a category of AI systems capable of generating text, images, or other media in response to prompts. These systems include ChatGPT and its variant Bing (built by OpenAI) and Bard (built by Google) among several others. Other Generative AI models include artificial intelligence art systems such as Stable Diffusion, Midjourney, and DALL-E. Any use of GenAI systems to produce assignments or exam answers for this course is not permitted. All work submitted for evaluation in this course must be the student's original work. The submission of any work containing AI generated content will be considered a violation of academic integrity ("Use of Unauthorized Materials").

Special exam: If you fail the course with a final grade between 40 and 49 (or if you qualify based on other circumstances, see link below), you may be eligible to write the special exam in June. The mark on the special exam will replace the mark that you received on the final exam in April. It is your responsibility to sign up for the special exam through Student Central before the deadline in May. It is advisable that you take the special exam very seriously because if you do poorly on it, your final grade may go down. We do not pick the highest of the two exam grades.

You can find information regarding the special exam here:
https://www.lakeheadu.ca/studentcentral/exams-grades/special-exam-criteria
https://www.lakeheadu.ca/studentcentral/exams-grades/special-exam-deadline-dates

More information: Please see the Frequently Asked Questions posted on D2L.

Schedule of Lecture Topics

Week of	Jan 5	Introduction to the Course Unit 1: Evolution – Darwin and Before
Week of	Jan 12	Unit 2: Evolution – Populations and Species Unit 3: Classification Unit 4: Prokaryotes
Week of	Jan 19	Unit 5: Protists Unit 6: Fungi Unit 7: Rise of Land Plants Unit 8: Seedless Plants
Week of	Jan 26	Unit 9: Gymnosperms Unit 10: Flowering Plants Unit 11: Introduction to Animals
Week of	Feb 2	Unit 12: The First Animals Unit 13: Lophotrochozoans
Week of	Feb 9	**Feb 9: Midterm Test 1 (No Lecture)** Unit 14: Ecdysozoans
Week of	Feb 16	**Study week**
Week of	Feb 23	Unit 15: Introduction to Deuterostomes Unit 16: Fishes
Week of	Mar 2	Unit 17: Amphibians Unit 18: Reptiles
Week of	Mar 9	**Mar 9: Midterm Test 2 (No Lecture)** Unit 19: Birds
Week of	Mar 16	Unit 20: Mammals
Week of	Mar 23	Unit 21: Introduction to Ecology and the Biosphere Unit 22: Population Ecology
Week of	March 30	Unit 23: Communities Unit 24: Ecosystems Unit 25: Biodiversity and Conservation

Schedule of Lab Topics

Week of Jan 5	Lab 1: Understanding Evolution and Classification (Chapters 16 and 17)
Week of Jan 12	Lab 2: Protists and Fungi (Chapters 20 and 26) **Experiment Setup**
Week of Jan 19	Lab 3: Seedless Plants (Chapters 21 and 22) **Quiz 1**
Week of Jan 26	Lab 4: Gymnosperms (Chapter 23) **Quiz 2**
Week of Feb 2	Lab 5: Angiosperms (Chapter 24 and 25) **Quiz 3**
Week of Feb 9	**Lab Test 1 (Labs 1–5)**
Week of Feb 16	**Study Week (No Lab)**
Week of Feb 23	Lab 6: Porifera, Cnidaria and the Lophotrochozoans (Chapters 28 and 29)
Week of Mar 2	Lab 7: Molluscs and Experiment Conclusion
Week of Mar 9	Lab 8: Ecdysozoans (Chapter 30) **Quiz 4**
Week of Mar 16	Lab 9: Deuterostomes (Chapter 31) **Quiz 5** **Mini Report Due**
Week of Mar 23	Lab 10: Understanding Ecology (Chapter 39) **Field Trip**
Week of Mar 30	**Good Friday (No Lab)**
Week of Apr 6	**Lab Exam 2 (Labs 6–10) on April 7*** (April 7 is a make-up day for classes that do not take place on April 3 due to Good Friday holiday)

Suggested Readings from OpenStax Biology 2e (Not Required)

OpenStax Biology 2e is a free, peer-reviewed, openly licensed textbook created as part of an initiative based at Rice University. It is an excellent resource for students who would like additional information and practice questions for topics covered in this course; please note that it is not a required textbook. A custom edited version of *OpenStax Biology 2e* is available on the course D2L webpage under Study Resources (Lectures). The full version of the textbook is available at *https//openstax.org*.

Unit 1: Evolution – Darwin and Before (Chapter 18)

Unit 2: Evolution – Populations and Species (Chapter 19)

Unit 3: Classification (Chapter 20)

Unit 4: Prokaryotes (Chapter 22)

Unit 5: Protists (Chapter 23)

Unit 6: Fungi (Chapter 24)

Unit 7: Rise of Land Plants (Chapter 25)

Unit 8: Seedless Plants (Chapter 25)

Unit 9: Gymnosperms (Chapters 26, 30)

Unit 10: Flowering Plants (Chapters 26, 30, 32)

Unit 11: Introduction to Animals (Chapters 27, 33, 43)

Unit 12: The First Animals (Chapter 27)

Unit 13: Lophotrochozoans (Chapters 28, 34)

Unit 14: Ecdysozoans (Chapters 28, 34)

Unit 15: Deuterostomes (Chapters 29, 34)

Unit 16: Fishes (Chapter 29)

Unit 17: Amphibians (Chapter 29)

Unit 18: Reptiles (Chapter 29)

Unit 19: Birds (Chapters 29, 34)

Unit 20: Mammals (Chapters 29, 34)

Unit 21: Introduction to Ecology and the Biosphere (Chapter 44)

Unit 22: Population Ecology (Chapter 45)

Unit 23: Communities (Chapter 45)

Unit 24: Ecosystems (Chapter 46)

Unit 25: Biodiversity and Conservation (Chapter 47)