School of Science

BIOL 101

Ecology, Evolution, and Diversity

Fall 2024

3 credits

Course Outline

INSTRUCTOR: Tara Stehelin PhD, Kate Chatfield-Reed PhD
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OFFICE HOURS: Thurs. 1:00 – 2:30
TIME/DATES: Lectures T/Th 10:30 am – 12:00 (lectures) in A2206-Lecture Hall
Labs: Thurs. 2:30 – 5:20 or Fri. 9:00 – 11:50

COURSE DESCRIPTION

This course is a core introductory science course, transferrable to most Canadian universities as one semester of a first-year level Biology course, emphasizing principles with wide applications to all living organisms, including the scientific process, principles of ecology, evolution via natural selection, and the origin and diversity of life. A comparative approach to the unity and diversity of organisms is stressed. Weekly mandatory lab sessions reinforce subject matter presented in lectures.

COURSE REQUIREMENTS

Prerequisite(s): *One of the following* is required (and more than one is recommended): Biology 11, Biology 12, or Chemistry 11 (or equivalent).
Corequisite(s): Math 12 (or equivalent) is recommended either as a pre-requisite or co-requisite. Students are expected to utilize basic mathematical skills.

EQUIVALENCY OR TRANSFERABILITY

This course transfers as one semester of first-year biology for Majors at most Canadian institutions, however, please be aware that receiving institutions determine course transferability. Find further information at: https://www.yukonu.ca/admissions/transfer-credit

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

1. use the scientific process and apply it to examples in biology,
2. give examples of the different levels of study in ecology and emergent properties at each level,
3. demonstrate understanding of genetics including mechanisms and patterns of inheritance,
4. demonstrate knowledge of principles of evolution via natural selection and other agents of evolution, and the origin of species,
5. demonstrate knowledge of the diversity of life across taxonomic groups,

6. conduct modern lab and field procedures safely and ethically, including microscope use, data collection, interpretation, and communication of results.

COURSE FORMAT

This course will be delivered with the following breakdown per week: three hours of lecture (in two 1.5-hour blocks), one three-hour lab, and zero hours of tutorial. Although it will vary from individual to individual, students should expect to spend 5-6 hours on course material outside of the classroom time (per week) on studying or completing assignments.

Delivery format

This course will be delivered in a face-to-face (in person) format.

EVALUATION

Lecture quizzes (5 in total)	45 %
Lab Assignments	17.5 % (50% of Lab Mark)
Lab Quizzes	17.5 % (50% of Lab Mark)
Final Exam	20 %
Total	**100%**

Please note that there is no midterm for this course. The midterm mark is based on lecture quizzes.

Lecture quizzes are given during normally scheduled class time and take 30 minutes to complete.

Lab quizzes are given at the start of each lab period (except the first lab) and take 15 minutes to complete. These are based on material covered in the previous lab and some questions on what will be done during that day's lab period. *Students are expected to read lab material before coming into the lab.* There is no final exam for the laboratory portion of the course.

Lab assignments are handed out at the beginning of lab sessions and are to be completed once lab exercises are completed. Some students finish assignments during the lab session, although they are not due until the next weekday at noon or otherwise determined by the lab instructor. Late assignments may be deducted -5% of marks per day.

Attendance in the laboratory is mandatory. ***Students must pass the lab and lecture portions of the course independently.***

COURSE WITHDRAWAL INFORMATION

Please refer to the YukonU website for important dates.

TEXTBOOKS & LEARNING MATERIALS

Students can purchase a textbook online or use eText access through the publisher (Pearson). There are also textbooks available for use *while in the lab* and several available in the library to borrow.

Campbell Biology, 3rd Canadian Edition (2020).

Authors: Reece, J. B., L. A. Urry, M. L. Cain, S. A. Wasserman, P. V. Minorsky, R. B. Jackson, F. E. Rawle, D. G. Durnford, C. D. Moyes, K. Scott, and S. J. Walde. Publisher: Pearson

Lab materials (e.g., lab manuals) are provided in the form of three-hole punched pages in the first lab.

Laboratory coats are mandatory, and students can purchase these online ahead of time, or at the YukonU campus bookstore.

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities. https://www.yukonu.ca/policies/academic-regulations

Please note that generative artificial intelligence (AI) tools such as ChatGPT can be useful in the same way as a web search. They can be a starting point but cannot be used to do the work for you. Simply copying the output and submitting it as your own work will be considered plagiarism the same as if you copied directly from a book, webpage, or a classmate. Furthermore, appropriate referencing is expected in submitted work. If generative AI is used as part of your writing workflow, this must be indicated as a footnote. Generative AI cannot be used as a reference source. AI tools are not actual sources of information and should not be referenced as such, much as you would not reference the results of a web search. References should be to the published scientific literature.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon University Academic Regulations (available on the Yukon University website). It is the student's responsibility to seek these accommodations by contacting the Learning Assistance Centre (LAC): LearningAssistanceCentre@yukonu.ca.

TOPIC OUTLINE

General topic	Chapters	Topics	# Lectures, quiz dates
1. **Introduction**	CH 1	Introduction to Biology and The Scientific Method	2
2. **Ecology**	CH 52	Biosphere Ecology	1
	CH 53	Population Ecology	2 ***Quiz 1 Sep 19****
	CH 54	Community Ecology	1
	CH 51 *in part*	Behavioral Ecology	1

3. **Genetics**	CH 14	Mendelian Inheritance	1
	CH 15	Chromosomal Basis of Inheritance	1 ***Quiz 2 Oct 3***
4. **Evolution**	CH 22, 23	Variation, Natural Selection	2 ***Quiz 3 Oct 17***
	CH 24	Speciation	1
5. **The Diversity of Life**	CH 25 *in part*	History of Life on Earth	1
	CH 27	Bacteria and Archaea	1 ***Quiz 4 Oct 31***
		Fall Reading week Nov. 12 - 15	
	CH 28	Eukarya: Protists	2
	CH 31	Fungi	1 ***Quiz 5 Nov 21***
	CH 29, 30	Plants	2
	CH 32, 33	Animals: Invertebrates	2
	CH 34	Animals: Vertebrates	3
	Review		
	Final Exam		***Dec 17 9 – 12:00***

Please note that quiz dates are final, but exact quiz topics may change depending on how fast we move through material

Lab Schedule

Lab 1	Ecology 1- The Boreal Forest: Introduction to ecosystems, trophic structures, plant identification, dichotomous key (*Outside lab-bring appropriate clothes to be outside*)
Lab 2	Ecology 2- Population Ecology and Community Interactions, population density
Lab 3	Behavioural Ecology – field trip
Lab 4	Genetics; Mendelian patterns of inheritance using *Drosophila,* introduction to a basic statistical test, the *chi-square*

Lab 5	Evidence for Evolution, Evolution and Natural Selection
Lab 6	Introduction to the Microscope The Evolution of Biological Diversity – Archaea, Bacteria, single-celled Eukaryotes
Lab 7	Fungal Diversity, Plant Diversity Part 1 - Seedless Plants
Lab 8	Plant Diversity Part 2 - Seed Plants
Lab 9	Animal Diversity Part 1 – Sponges, Cnidaria, Platyhelminthes
Lab 10	Animal Diversity Part 2 – Mollusca, Annelida, Nematoda
Lab 11	Animal Diversity Part 3 - Arthropods, Echinoderms, Chordates