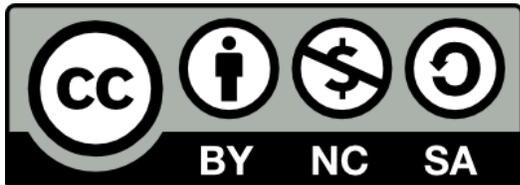# Yukon University

# COURSE OUTLINE

# BIOL 101
# Evolution and Biodiversity

## 3 **CREDITS**

PREPARED BY: Tara Stehelin, Biology Instructor
DATE: April 23, 2020

APPROVED BY:  Joel Cubley, Chair, School of Science
DATE: August 18, 2020

APPROVED BY SENATE: Click or tap to enter a date
RENEWED BY SENATE:  Click or tap to enter a date

# Evolution and Biodiversity

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|---|---|
| **INSTRUCTOR:** Tara Stehelin, MSc, PhD | **OFFICE HOURS:** Thurs 1:00 – 2:30 |
| **OFFICE LOCATION:** A2806 | **CLASSROOM:** A2206, A2805 |
| **E-MAIL:** tstehelin@yukonu.ca | **TIME:** T/R 10:30 – 12:00, Labs F 9:00 – |
| **TELEPHONE:** (867) 456-6957 | 12:00/1:00 – 4:00 |

## 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.

## PREREQUISITES

*One of the following* is required (and more than one is recommended): Biology 11,12, or Chemistry 11 (or equivalent).

## RELATED COURSE REQUIREMENTS

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 first-year biology (one semester) to most Canadian Universities. Please see the BC Transfer Guide or contact the School of Science for more information on transferability.

## LEARNING OUTCOMES

Upon successful completion of the course, the student 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 knowledge of principles of evolution via natural selection and other agents of evolution, and the origin of species,

4. demonstrate knowledge of the diversity of life across taxonomic groups,

5. use basic principles of chemistry and how it applies to biological systems,

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

## COURSE FORMAT

Three hours of lecture, three hours of labs, and zero hours of tutorial per week.

Material will be presented in two lectures and one lab session per week. Attendance in the laboratory is mandatory. *Students must pass the lab and lecture portions of the course independently.*

Because of unusual circumstances of the 2020 **SARS Cov-2 pandemic**, lectures will be delivered online. Students are greatly encouraged to attend lectures when they are delivered synchronously (during the lecture time) although lectures will be recorded and can be watched later. Some lab activities will be conducted online, although most labs will be face to face, with some added precautionary measures in place in the lab. Please follow all directions carefully. *Students are expected to have access to a computer for best viewing of online lectures and activities. If this is not possible, please contact the university to make other arrangements.*

## ASSESSMENTS

### Attendance & Participation

Students must attend the laboratory session assigned to them upon registration, once per week*. Attendance is mandatory in labs and greatly encouraged in lectures.* Absence from labs results in a zero grade assigned for assignments and quizzes relevant to the missed lab. If the instructor is notified in advance of potential problems with attendance for medical reasons or travel with a sports team, alternate work may be arranged.

### Assignments

Lab assignments are handed out at the beginning of laboratory sessions and are to be completed once lab exercises are done. Most students finish assignments during the lab session, although they are not due until the next weekday at noon.

### Tests

Quizzes on lecture material occur once every two weeks. There are 5 quizzes in total. The final examination will cover material from the entire course. Quizzes on laboratory material are given every lab session (except the first) and cover material from the lab exercises the week before and a few questions from that week's lab. *Students are expected to read lab material before coming into the lab.* There is no final exam for the laboratory portion of the course.

**EVALUATION**

| Lecture Quizzes | 45% |
|---|---|
| Lab Assignments | 21% (60% of lab mark) |
| Lab Quizzes | 14% (40% of lab mark) |
| Final Exam | 20% |
| Total | **100%** |

**REQUIRED TEXTBOOKS AND MATERIALS**
*Campbell Biology, 3rd Canadian Edition* (2020). The 2nd edition is fine too.
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
Purchase eText access through Pearson

**ACADEMIC AND STUDENT CONDUCT**
Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

**PLAGIARISM**
Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the instructor, resubmitting work which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the University.

**YUKON FIRST NATIONS CORE COMPETENCY**
Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First

Nations. For details, please see www.yukonu.ca/yfnccr.

*Please note that traditional knowledge involving the connectedness of living things and principles of local first peoples will be addressed whenever possible in this course.*

## 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. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC): lac@yukonu.ca.

## TOPIC OUTLINE

| General topic | Chapter | 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 | *Quiz 1 Sep 17* |
| | CH 54 | Community Ecology | 1 |
| | CH 51 *in part* | Behavioral Ecology | 0.5 |
| 3. Evolution | CH 22, 23 | Variation, Natural Selection | 1 |
| | CH 24 | Speciation | 1 *Quiz 2 Oct 1* |
| 4. The Diversity of Life | CH 25 *in part* | History of Life on Earth | 1 |
| | CH 27 | Bacteria and Archaea | 1 |
| | CH 28 | Eukarya: Protists | 1 *Quiz 3 Oct 15* |

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|---|---|---|---|
| | CH 31 | Fungi | 1 |
| | CH 29, 30 | Plants | 2 *Quiz 4 Oct 29* |
| | CH 32, 33 | Animals: Invertebrates | 2 |
| | CH 34 | Animals: Vertebrates | 2 *Quiz 5 Nov 19* |
| 5. Introduction to the Basic Chemistry of Life | CH 3 | The chemistry of water | 1 |
| | CH 4, 5 | Organic Chemistry – Introduction to Macromolecules | 1 |
| | Date set by administration | | *Final Exam* |

*Please note that quiz dates are "set" but exact quiz topics may change depending on how fast we move through material!*

**Lab Schedule and List of Topics – *Labs typically start in the SECOND WEEK of CLASSES***

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, quadrat sampling (*outside exercise*), mark-and-recapture, growth curves, evolution and diversity of community interactions

Lab 3     Evidence of Evolution, Evolution and Natural Selection, genetic drift, gene flow, and natural selection exercises

Lab 4     Introduction to the Microscope
The Evolution of Biological Diversity – Archaea, Eubacteria, and Protists

Lab 5      Fungal Diversity, Plant Diversity Part 1 - Seedless Plants

Lab 6      Plant Diversity Part 2 - Seed Plants

Lab 7      Plant form and function – Seed plants continued

Lab 8      Animal Diversity Part 1 - Porifera, Cnidaria, Platyhelminthes, Nematoda, and Rotifers

Lab 9      Animal Diversity Part 2 - Molluscs and Annelids

Lab 10      Animal Diversity Part 3 - Arthropods, Echinoderms and Chordates

Lab 11      Introduction to the Chemistry of Life – The Unique Properties of Water