



**COURSE OUTLINE**

**BIOLOGY 101  
PRINCIPLES OF BIOLOGY I**

**45 HOURS Lecture, 45 HOURS Lab  
3 CREDITS**

PREPARED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Tara Stehelin, Instructor

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
Margaret Dumkee, Dean

APPROVED BY ACADEMIC COUNCIL: ()

RENEWED BY ACADEMIC COUNCIL: ()



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## BIOLOGY 101, PRINCIPLES OF BIOLOGY I

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<b>INSTRUCTOR:</b> Tara Stehelin, B.Sc., M.Sc.	<b>OFFICE HOURS:</b> Friday 11:00 - 12:30, or by appointment
<b>OFFICE LOCATION:</b> A2806	<b>CLASSROOM:</b> Lecture A2402 Lab A2805
<b>E-MAIL:</b> <a href="mailto:tstehelin@yukoncollege.yk.ca">tstehelin@yukoncollege.yk.ca</a>	<b>DATES and TIMES:</b> Lecture Mondays & Wednesdays 11:00 - 12:20
<b>TELEPHONE:</b> (867) 456-6957	<b>Labs:</b> Fridays 9:00 - 12:00 or 1:00 - 4:00

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### COURSE DESCRIPTION

This course is a core introductory science course, transferrable to most Canadian universities as a first-year level Biology course, emphasizing principles with wide applications to all living organisms, including cell structure and function, metabolism, mechanisms of inheritance, the diversity of life, evolution and adaptations to the environment. A comparative approach to the unity and diversity of organisms is stressed. Weekly mandatory lab sessions reinforce subject matter presented in lectures.

### PREREQUISITES

Admission to the Division of Applied Science & Management. Biology 11 and Chemistry 11 (or equivalent) are both highly recommended. Biology 12 is recommended. Math 12 (or equivalent) is recommended either as a pre-requisite or co-requisite. Students are expected to possess 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, students will be able to demonstrate knowledge and understanding of the following:

### 1. General Biology Learning Outcome

-the steps taken in rigorous scientific process and what defines a living organism, including knowledge of the 8 unifying themes of living organisms

### 2. Ecology Learning Outcomes

-levels of study in ecology and examples of new properties that emerge at each level, factors that determine and influence distribution of life on Earth based on climate, and definitions habitat, fitness, niche, concepts of population ecology such as sample, density, dispersion, mark-and-recapture, and growth models, interpretation of life tables and survivorship curves, and knowledge of life histories, structure and dynamics of communities, including types of interactions, and how they influence fitness and diversity, trophic structures, species diversity, keystone species, disturbance and primary or secondary succession, invasive species, ecosystem structure and dynamics, including primary production and nutrient cycling

### 3. Evolution Learning Outcome

-the observations and main inferences of Charles Darwin such as concepts of evolution, natural selection, mutation, and sources of evidence for evolution, application of Hardy-Weinberg equilibrium, causes of evolutionary change (microevolution), patterns of change in phenotypes resulting from natural selection (macroevolution), causes of speciation, concept of hybridization and reproductive isolating mechanisms

### 4. The Diversity of Life Learning Outcome

-overview of taxonomic groups and the origin of species, unifying characteristics and basic knowledge of the diversity within each of the taxonomic groups; prokaryotes and the two main kingdoms within, eukaryotes including protists and the main groups within, fungi, plants and evolutionary patterns from non-vascular to seedless vascular to seed plants, evolution and adaptations in angiosperms, evolutionary patterns in animals from invertebrates, protostomes, segmented animals, to deuterostomes and chordates, and the challenges of life on land for both plants and animals

### 5. Chemical Basis of Life Learning Outcomes

-unique properties of water that allow it to support life, basic understanding of chemical bonds, molecules, and atoms, and the elements that make up living things, and classes of most commonly found compounds found in living things and common functional groups

### 6. Cell Structure and Functioning Outcomes

-general structure of the cell and the organelles within cells and the differences in cell structure among taxonomic groups, functions of proteins in the cell, communication between cells and jobs of membranes, energy use and basic steps in metabolism by the cell, control and use of enzymes, mechanisms of transport at the cellular level

-metabolic reactions in the cell, such as those involved in cellular respiration and ATP (energy) production and those involved in photosynthesis, light pigments, and production of high energy compounds

### Lab Learning Outcomes

Upon completion of mandatory lab sessions students will be able to demonstrate knowledge of basic ecological practices such as population density estimations, complete a basic statistical test, recognize sources of evidence for evolution, identify general groups of bacteria based on shape, differentiate between prokaryotic and eukaryotic cells, recognize cells of fungi and protists, and recognize the diversity within protists. Students will be able to demonstrate correct procedures of microscopy using both compound and stereomicroscopes, including the ability to prepare wet mount slides with live organisms. Students will be able to demonstrate practical knowledge necessary to conduct dissections on several invertebrate organisms, including clams, roundworms, segmented worms, crayfish, insects, sea stars, and one (optional) vertebrate, frogs. Students will also be able to identify organelles within cells and conduct basic laboratory tasks such as incubation of test tube cultures in a water bath.

### COURSE FORMAT (3-3-0)

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.*

## ASSESSMENTS

### Attendance policy

Students must attend the laboratory session assigned to them upon registration, once per week. Attendance is mandatory in labs and 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.

### Lab assignments

Assignments are handed out at the beginning of laboratory sessions and graded on the basis of understanding and applying principles involved as well as the correctness of answers to solutions. Most students finish assignments during the lab session, although they are not due until the next week day at noon.

### Tests

Quizzes on lecture material are given approximately once every two weeks. There are 5 quizzes in total, worth 10% each. The final examination will be held at the end of the term and is worth 15% of the total mark. It will cover material from the entire course and the examination date will be announced as soon as confirmed by administration. 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 (5) 10% each	50%
Final exam	15%
Lab Assignments (11)	17.5%
Lab Quizzes (10)	17.5%
Total	100%

## REQUIRED TEXTBOOKS AND MATERIALS

Campbell Biology, 2<sup>nd</sup> Canadian Edition (2017)

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.

Pearson, Benjamin Cummings

ISBN-10: 0134589947 ISBN-13: 978-0134189116

*Available for purchase in the bookstore*

**Lab Manual:** will be assembled by instructor and handed out during first lab session

## 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 Service/ Admissions & Registration web page.

## PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper 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 College.

## YUKON FIRST NATIONS CORE COMPETENCY

Yukon College 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 College program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see [www.yukoncollege.yk.ca/yfnccr](http://www.yukoncollege.yk.ca/yfnccr).

### **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 College Academic Regulations (available on the Yukon College 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@yukoncollege.yk.ca](mailto:lac@yukoncollege.yk.ca).

### **THE LORENE ROBERTSON WRITING CENTRE**

All students are encouraged to make the Writing Centre a regular part of the writing process for coursework. The Lorene Robertson Writing Centre is staffed by helpful writing coaches from across the College and offers one-on-one appointments to students in need of writing support. For in-person appointments, the Centre coaching office is located in the Academic Support Centre in room A2302. You can also participate in coaching appointments over the phone or online. See the Academic Support Centre schedule for English and writing support times.



## Topic Outline

General topic	Chapters	Topics	# Lectures, quiz date
1. Introduction	CH 1	The Scientific Method	1
2. Ecology	CH 52	Introduction to Ecology and the Biosphere	1
	CH 53	Population Ecology	1 <i>Quiz 1 Sep 19</i>
	CH 54	Community Ecology	1
3. Evolution	CH 22, 23	Variation, Natural Selection	1
	CH 24	Speciation	1
4. The Diversity of Life	CH 25 (part)	History of Life on Earth	0.5 <i>Quiz 2 Oct 3</i>
	CH 27	Bacteria and Archaea	1
	CH 28	Eukarya: Protists	1
	CH 31	Fungi	1 <i>Quiz 3 Oct 17</i>
	CH 29, 30	Plants	2
	CH 32, 33	Animals: Invertebrates	2 <i>Quiz 4 Oct 31</i>
	CH 34	Animals: Vertebrates	1
5. Basic Chemistry of Life	CH 3	The chemistry of water	1
	CH 4, 5	Organic Chemistry	1
6. Cell Structure & Function	CH 6, 7	Organelles, functions Membrane structure	2 <i>Quiz 5 Nov 21</i>

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7. Basic Metabolism	CH 8	Energy flow, ATP, membrane function	2
	CH 9	Cellular Respiration and Fermentation	2
	CH 10	Photosynthesis	2
Date set by administration			<i>Final Exam</i> *

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\*(Cumulative but mostly focused on portion since last quiz)

### Lab Schedule and List of Topics

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Lab #	Lab Topic
Lab 1	Ecology 1- The Boreal Forest: Introduction to ecosystems, trophic structures, plant identification, dichotomous key (Outside lab)
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	The Microscope Introduction The Evolution of Biological Diversity - Archaea, Eubacteria, and Protists
Lab 5	Fungi Diversity, Plant Diversity Part 1 - Seedless Plants
Lab 6	Plant Diversity Part 2 - Seed Plants
Lab 7	Animal Diversity Part 1 - Porifera, Cnidaria, Platyhelminthes, and Nematoda, Rotifers

- Lab 8      Animal Diversity Part 2 - Molluscs and Annelids
- Lab 9      Animal Diversity Part 3 - Arthropods, Echinoderms and Chordates
- Lab 10     Chemistry of Life - Water
- Lab 11     The Cell - Cell structure and function, membrane transport processes
- Lab 12     The Cell - Cellular Respiration and Photosynthesis, glycolysis demonstration using yeast, paper chromatography