



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: _____

YUKON COLLEGE

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Course Outline prepared by Tara Stehelin, May 24, 2017.

Yukon College
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PRINCIPLES OF BIOLOGY I

INSTRUCTOR: Tara Stehelin, B.Sc., M.Sc.	OFFICE HOURS: Friday 11:00 - 12:30, or by appointment
OFFICE LOCATION: A2806	CLASSROOM: Lecture A2402 Lab A2805
E-MAIL: tstehelin@yukoncollege.yk.ca	DATES and TIMES: Lecture Tuesdays and Thursdays 1:00 - 2:30 Labs: Wednesdays OR Fridays 1:00 - 4:00
TELEPHONE: (867) 456-6957	

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, 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 Outcomes

-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 define concepts of habitat, fitness, regulation, 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 growth models and diverse adaptations that exist as a result of community dynamics, trophic structures, concepts of 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 Outcomes

-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 Outcomes

-overview of taxonomic groups and the origin of species, unifying characteristics and basic knowledge of the diversity within each of the following taxonomic groups; prokaryotes and the two main kingdoms within, protists and the five 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, protostomates, segmented animals, to deuterostomates, and finally to 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 cell structure, structure and functions of organelles, 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

-cellular respiration, redox reactions, and ATP (energy) production

-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 size and 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

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, alternate work can be arranged.

Students must attend the laboratory session assigned to them upon registration, once per week.

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. A lab quiz will be given each week during each scheduled lab to assess progress.

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. There is no final exam for the laboratory portion of the course.

EVALUATION

Lecture		
Quizzes (5) 10% each	50%	
Final exam	15%	
		65%
Lab		
Assignments (11)	17.5%	
Quizzes (10)	17.5%	
		35%
Total		100%

REQUIRED TEXTBOOKS AND MATERIALS

Campbell Biology, 2nd 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

Or

“Campbell Biology” 8th edition or newer, Reece, Urry, Cain, Wasserman, Minorsky, and Jackson. Pearson Benjamin Cummings

Lab Manual: 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 Services/ Admissions & Regulations 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.

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) at (867) 668-8785 or lassist@yukoncollege.yk.ca

TOPIC OUTLINE

WEEK	TOPIC		
1	Introduction to Biology: - Overview and introduction to biological science - scientific method		
2	Ecology: - Diversity of life in the biosphere - Population Ecology	Quiz 1	Sept 21
3	Evolution and Speciation: - Evidence of evolution, history, classification, - Natural selection - speciation	Quiz 2	Oct. 5
4, 5,6	Diversity: - The Kingdoms of Life - taxonomy - Prokaryotes - Protists - Fungi	Quiz 3	Oct. 19
9,10	Cell Theory, Metabolism - basic chemistry of life - enzymes - membrane function - organelles - energy flow	Quiz 4	Nov. 2
11,12	Respiration & Photosynthesis - glycolysis - aerobic respiration - glucose production	Quiz 5	Nov. 23
13	Review		

Lab Schedule and List of Topics

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