



**YUKON COLLEGE**

August 2017

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Course Outline prepared by Gerald Haase, August 2017

Yukon College  
P.O. Box 2799  
Whitehorse, YT  
Y1A 5K4

## INTRODUCING BIOLOGY

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<b>INSTRUCTOR:</b>	Gerald Haase	<b>OFFICE HOURS:</b>	Thursdays 2:30 - 4:30
<b>OFFICE LOCATION:</b>	Room A2320	<b>CLASSROOM:</b>	A2206
<b>E-MAIL:</b>	ghaase@yukoncollege.yk.ca	<b>TIMES:</b>	Please see below
<b>TELEPHONE:</b>	(867) 668-8757	<b>DATES:</b>	Please see below

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<b>COURSE OFFERING</b>	September 7, 2017 to December 15, 2017 Lectures: Tuesdays & Thursdays 1:00 - 2:25 p.m. Labs: Mondays: 1:00 p.m. to 4:00 p.m. (Room A2805)
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### COURSE DESCRIPTION

Introducing Biology covers the principles of many aspects of biology similar to those described by the ABE Articulation, Advanced Level, of British Columbia. This course deals with the scientific method, the chemical and physical background for biology, plant tissues, microscopy, plant nutrition, movement and transport, basic genetics, animal behaviour, evolution, ecology, photosynthesis, cell division, and the classification of living organisms and viruses. Biology 050 is articulated with B.C. and Alberta Advanced Biology courses and is a prerequisite for Biology 060 (which could lead to a university biology program) as well as for the Renewable Resources program at Yukon College.

### PREREQUISITES:

Sixty-five percent (65%) in high school science (grade 10), or Yukon College Science 030 including units in Human Biology and Introductory Chemistry, or permission of the instructor. Students may be asked to demonstrate writing skills. ***Students must be at an English 050 (English 11) writing level.***

### LEARNING OUTCOMES:

At the completion of this course, the student will:

1. Meet the competencies as stated for ABE Advanced Level Biology located in the current edition of the ABE Articulation Handbook online.
2. Understand and be able to communicate the basic concepts of biology covering similar material to that of Yukon Biology 11, as described in the course description above.

3. Have the prerequisites, knowledge, and skills to enter science programs, especially those related to biological sciences such as a health program or Renewable Resources.
4. Be able to enter, with confidence, Biology 060, which could lead to a first-year university biology course.
5. Have an appreciation of biology within the course context as well as in a larger perspective, such as the relation of biology to chemistry and physics, First Nations attitudes towards life, and the role of biology in socio-economics.

#### **DELIVERY METHODS/FORMAT:**

1. There are approximately thirty scheduled 1 ½-hour sessions generally consisting of:
  - review / topic introduction
  - viewing videos / online content
  - lecture / discussion / notes
2. The laboratories consist of seven three-hour sessions.
3. Material is tested in two three-hour exams.
4. Course activities, such as field trips and guest speakers, which are relevant to the subject material or to various cultural beliefs (e.g. First Nations), may be included. Student input on potential activities will be encouraged at the beginning of this course. *Traditional medicines (plants), traditional foods and nutrition (implications of changes), and why plants grow in one area and not another are some of the possible topics to explore.*

#### **COURSE REQUIREMENTS/ASSESSMENTS:**

##### **Attendance Policies**

The following is an excerpt from the Yukon College Academic Regulations and Procedures (January 2000) manual from section 4.01—Attendance:

##### **4.01 Attendance**

Students in all program areas are expected to attend classes. However, attendance requirements may vary from program to program. Special permission from the Dean or Chair is required if a student is enrolled in another course and the timetables for the two courses overlap. Attendance requirements are noted below.

- Individual instructors shall inform students of the attendance requirements for their course at the beginning of the semester.
- Admission to a lecture or laboratory may be refused by the instructor due to lateness or misconduct. Students who do not attend classes or submit assignments as required may be refused admission to further classes.

- Attendance at practicum activities and work placement activities (in Co-op programs) is required. Students shall notify the placement agency as well as the instructor whenever practicum/work attendance is not possible.
- Attendance for sponsored students will be reported to the sponsoring agency as required.

### **Attendance Policies -- Specific**

Students must attend the laboratory sessions in order to submit a report. Students arriving late to a laboratory session may be refused entry, and will be assessed a late penalty.

### **Assignments**

1. Material covered in this course is derived from 20 chapters of the textbook. Of these chapters, 15 assignments will be handed in (typewritten or word processed, please), with one or two chapters covered in each assignment. **The textbook is the primary resource of this course.** Assigned questions are meant to be representative; although only some questions from each chapter will be assigned, students should have a thorough knowledge of all material covered. Assignments are due two biology classes after the chapter is covered.
2. Supplementary and bonus assignments may also be assigned or offered.
3. After each of the 7 laboratories, a lab assignment is handed in. Due date for labs is one week after the lab is performed.

### **Examinations:**

There are two examinations covering the contents as follows:

1. Midterm Exam - chapters 1-6, 23, 8, 9, 10
2. Final Exam - chapters 27-36

### **Seminar Presentation / Research Report**

Students who select the research seminar will be required to research and present a topic relevant to Biology 050. The presentation should be no longer than 20 minutes. For students who select the seminar, no paper will be required.

Students who select the research report will be required to research and submit a report on a topic relevant to Biology 050. No class presentation will be required. Critical thinking questions are a prime source of research topics; students who choose their own topics will need to submit their topic ideas to the instructor for approval. **This is a formal research report; it is to be written according to CSE format. Students should be clear on the criteria before beginning the paper, and ensure that all relevant resources are utilized.**

## EVALUATION

A final grade for the course will be assigned on the following basis:

Assignments	20%
Labs	20%
Seminar or report	10%
Midterm Exam	25%
Final Exam	25%
Total:	100 %

Yukon College uses a letter grade system and calculates weighted grade point averages (GPA) on a 4.0 scale. Following are equivalents of the letter grades:

LETTER GRADE	PERCENTAGE EQUIVALENT	GRADE POINT
A+	95 - 100	4.0
A	86 - 94	4.0
A-	80 - 85	3.7
B+	75 - 79	3.5
B	70 - 74	3.0
B-	65 - 69	2.7
C+	62 - 64	2.5
C	58 - 61	2.0
C-	55 - 57	1.7
D	50 - 54	1.0
F	under 50	0.0

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### Rewrites

A rewrite for a failing grade on an examination (less than 50%) may be permitted at the instructor's discretion. These examinations will be written no earlier than two weeks after the date of the original examination. The mark will be recorded whether it is higher or lower than the original. However, a maximum mark of 65% will be awarded.

### "No Shows"

A student who misses an examination will receive a mark of zero for that examination but may be permitted a rewrite. Exceptions may be made if a student receives prior permission from the instructor, or faces an emergency. Some form of documentation of the emergency may be required.

**Note:** The passing mark for this course is 50%. A mark of 65% or better is required for entrance into Biology 060.

## **REQUIRED TEXTBOOKS/MATERIALS:**

Mader, Sylvia and Windelspecht, M., *Inquiry Into Life, 15<sup>th</sup> Edition*  
Yukon College Laboratory Manual (supplied to students via course fees)  
Videos and animations as provided by the textbook website & Moodle site  
Laboratory materials as required (available for use at the campus)

## **ACADEMIC AND STUDENT CONDUCT**

Information on academic standing and student rights and responsibilities can be found in the Academic Regulations:

[http://www.yukoncollege.yk.ca//downloads/Yukon\\_College\\_Academic\\_Regulations\\_and\\_Procedures\\_-\\_August\\_2013\\_final\\_v1.pdf](http://www.yukoncollege.yk.ca//downloads/Yukon_College_Academic_Regulations_and_Procedures_-_August_2013_final_v1.pdf)

## **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) at (867) 668-8785 or [lassist@yukoncollege.yk.ca](mailto:lassist@yukoncollege.yk.ca).

## TOPIC OUTLINE/SYLLABUS

### Methods and Concepts

- Levels of Biological Organization
- Diversity
- Responding to Change
- Scientific Method

#### Specific Learning Outcomes: It is expected that students will be able to:

- a. describe the hierarchy of organization, from atoms and molecules through cells to the biosphere
- b. describe the characteristics of living organisms which distinguish them from non-living things
- c. make detailed observations about the natural world
- d. formulate hypotheses
- e. design and conduct experiments
- f. critique experimental results and write scientific reports
- g. discuss the effects of science and technology on society

### Atoms and Molecules

- Atomic Theory
- Bonding
- Inorganic and Organic Molecules
- Fluid Mosaic Model of Membranes

### The Cell

- Cell Theory
- Organelles
- Plant and Animal Cells
- Cell Cycles and Division

### Diffusion

- Permeability, Diffusion
- Osmosis, Dialysis
- Passive/Active Transport

#### Specific Learning Outcomes: It is expected that students will be able to:

- a. explain how the distribution of electrons in an atom or an ion determines the number and kinds of chemical bonds that can be formed
- b. describe the essential chemistry and characteristics of water
- c. compare characteristics of acids, bases, and salts
- d. explain how small organic molecules are assembled into macromolecules by condensation, and how the reverse process is accompanied by hydrolysis

- e. identify the general structure of a monosaccharide, fatty acid, amino acid, and nucleic acid
- f. demonstrate an understanding of cell theory
- g. identify and describe the function of major cell components and relate structure to function
- h. distinguish between eukaryotic and prokaryotic cells
- i. describe the essential role of DNA
- j. define diffusion and relate its importance to biological processes
- k. differentiate between passive and active transport

### **Energy-Acquiring and Energy-Releasing Pathways**

- Chlorophyll
- Leaf Structure
- Photosynthesis (Light and Dark Reactions)
- Cellular Respiration
- Aerobic and Anaerobic Reactions

#### **Specific Learning Outcomes: It is expected that students will be able to:**

- a. describe the pathways by which energy enters organisms and passes to other organisms and back into the environment
- b. outline the steps of light-dependent and light-independent reactions, including reactants and products of each phase

### **Basic Genetics**

- Cell Division and the Cell Cycle
- Mendelian Laws
- Genetics Problems (Punnett Square)
- Linkage in Genes and Chromosomes

#### **Specific Learning Outcomes: It is expected that students will be able to:**

- a. list factors that cause cells to reproduce
- b. identify and describe phases of mitosis
- c. explain Mendel's principles of dominance, segregation, and independent assortment
- d. solve genetics problems involving monohybrid and dihybrid crosses
- e. describe variations that can occur in observable patterns of inheritance
- f. define various genetic terms including, but not limited to: gene, allele, dominance, homozygous, heterozygous, genotype, phenotype

### **Classification 1: Viruses, Domains Bacteria and Archaea; Kingdoms Protista and Fungi**

#### **Specific Learning Outcomes: It is expected that students will be able to:**

- a. recognize the hierarchical system of classification from domain to species
- b. in binomial nomenclature, recognize the generic and specific

- names
- c. describe criteria for classification of organisms and explain why classification systems change
  - d. identify an organism using a dichotomous key
  - e. distinguish the kingdoms into which organisms are classified by identifying characteristics and representatives of each
  - f. describe the basic structure of a virus
  - g. compare viruses to living cells
  - h. define disease in terms of interaction between pathogen and host
  - i. list diseases caused by viruses and discuss their health and economic consequences
  - j. describe the body's basic lines of defense against a viral attack
  - k. describe the importance of prokaryotes as decomposers, autotrophs, and symbionts
  - l. explain how bacteria become resistant to antibiotics
  - m. describe general characteristics of protists
  - n. differentiate between various protistan phyla and give examples of each
  - o. compare and contrast a prokaryotic cell to a eukaryotic cell
  - p. discuss protists as beneficial and harmful to humans
  - q. discuss the possible origin of multicellularity
  - r. describe general features of Fungi and list characteristics that distinguish them from organisms in the other kingdoms
  - s. name Fungi divisions and list their distinguishing characteristics
  - t. describe lichens and their ecological importance
  - u. explain how fungi are ecologically and commercially important
  - v. describe mycorrhizae, and explain their importance to natural ecosystems

### **Classification 2: Kingdom Plantae**

- Characteristics of Plants
- Nonvascular Plants/Vascular Plants
- Seed Plants
- Comparisons between Plants

### **Plant Nutrition**

- Basic Requirements
- Roots

### **Plant Movement and Transport**

- Mechanisms
- Non-directional Movement and Tropisms
- Water and Sugar Transport in Vascular and Nonvascular Plants
- Plant hormones

### **Plant Reproduction**

- Alternation of Generations: Algae, Mosses, Ferns, Seed Plants
- Pollination and Fertilization

- Monocots and Eudicots

**Specific Learning Outcomes:** It is expected that students will be able to:

- describe general characteristics of plants
- examine plant reproduction and distinguish between sporophyte and gametophyte generations
- categorize plants into non-vascular, vascular seedless, vascular seed plants and vascular seed plants with flowers and fruits
- describe adaptations of major plant divisions to their environments
- discuss trends in the evolution of plants, from unicellular algae to life on land
- describe the ecological and economic significance of plants from each of the major divisions

**Classification 3: Kingdom Animalia - Invertebrates**

- Evolution and Classification
- Primitive Invertebrates
- Advanced Invertebrates

**Classification 4: Kingdom Animalia - Vertebrates**

- Chordates: Protochordates
- Chordates: Vertebrates
- Comparisons between Vertebrates

**Specific Learning Outcomes:** It is expected that students will be able to:

- describe general features of animals, and list characteristics that distinguish them from organisms in the other five kingdoms
- list the basic life processes that all animals must perform
- name the major phyla, and list distinguishing features of each
- describe adaptations of representatives of selected phyla to their environments
- discuss trends in the evolution of animals, including levels of tissue organization, symmetry, and system development
- describe how selected representatives of major phyla perform the basic life processes
- demonstrate safe dissection techniques
- distinguish between invertebrates and vertebrates and describe the vertebrate classes

**Theory of Evolution**

- Early Theories
- Darwin's contributions
- Theory of, and Evidence for Evolution
- Evolution and the Gene Pool
- Directional Selection and Types of Speciation

**Specific Learning Outcomes:** It is expected that students will be able to:

- a. define evolution, species, speciation
- b. describe the evidence for evolution, and cite examples of observable evolutionary change
- c. interpret a phylogenetic tree
- d. state Darwin's theory of organic evolution by natural selection
- e. identify sources of variation in a gene pool
- f. identify the role of extinction in evolution
- g. compare hypotheses about the origin of life
- h. describe processes of speciation

**Basic Ecology**

- Ecosystems & Biomes
- Nutrients
- Food Chains, Energy Flow
- Habitat and Niche
- Populations and Communities

**Human Ecology**

- Population
- Environmental Problems
- Conservation

**Animal Behaviour**

- Genetic Basis of Behaviour
- Innate and Learned Behaviours

**Specific Learning Outcomes:** It is expected that students will be able to:

- a. define: ecology, biosphere, biomes, ecosystem, community, population
- b. describe the four components of the planetary ecosystem (living organisms, solid earth, atmosphere and water) and describe interactions within and between them
- c. describe the flow of energy through the biosphere
- d. explain cycling of biochemical materials through an ecosystem
- e. describe major biomes and list examples of organisms native to each
- f. describe ecological succession and apply the concept to disturbed and managed ecosystems
- g. compare exponential and logistic population growth.
- h. relate population growth to environmental carrying capacity
- i. describe limiting factors which control population growth
- j. describe effects of air pollution, acid rain, global warming, ozone layer depletion, water pollution, toxic waste, species and ecosystem extinctions, and habitat destruction, with local examples where applicable
- k. discuss solutions to local and global ecological issues, and identify local and global environmental successes

- l. outline costs and benefits of group living versus individual or small group units
- m. relate animal behaviours to endocrine and nervous system functions
- n. discuss the importance of adaptive behaviour
- o. describe how successful behaviours evolve
- p. describe major types of behaviour
- q. define communication behaviour and list ways in which animals communicate