

**Applied Science and Management
School of Science
Winter 2016**



COURSE OUTLINE

Biology 060

**COLLEGE PREPARATION-
BIOLOGY: CONCEPTS AND APPLICATIONS**

87.5 hours
3 Credits

PREPARED BY _____
Instructor

DATE _____

APPROVED BY _____
Dean, Applied Science & Management

DATE _____

APPROVED BY ACADEMIC COUNCIL:
RENEWED BY ACADEMIC COUNCIL:

YUKON COLLEGE

December 2015

All rights reserved. No part of this material covered by this copyright may be reproduced or utilized in any form or by any means, electronic or mechanical, traded, or rented or resold, without written permission from Yukon College.

Course Outline prepared by Gerald Haase, December 2015

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



Biology 060

Who? When? Where?

Course Instructor:	Gerald Haase
Phone Number:	(867) 668-8757
Fax Number:	(867) 668-8828
E-mail Address:	ghaase@yukoncollege.yk.ca
Office Hours:	Wednesdays 1:00 – 3:00
Office Location:	Room 2320, Ayamdigut Campus
Course Schedule:	Monday 1:00 – 2:30 Tuesday 1:00 - 2:30 Thursday 1:00 - 2:30

Biology Tutoring may also be available on:

- Mondays at 2:30 – 4:00 when there are no labs

Course Description:

Biology: Concepts and Applications (Diploma Level) covers the principles of biology similar to those described by the ABE Articulation, Provincial Level, of British Columbia, with an emphasis on vertebrate and human biology. Biology 060 with appropriate marks will allow students to enter a first-year college or university biology course, or a Practical Nursing Program.

Prerequisites:

A minimum of sixty-five percent (65%) in Grade 11 biology, or Yukon College Biology 050, or permission of the instructor. English 050 is required as a co-requisite.

Equivalency or Transferability

Biology 060 is equivalent to Yukon and B.C. Biology 12, and is transferable to colleges and universities on the BCCAT grid (<http://www.bctransferguide.ca/>). The core topics of the course reflect those listed in the British Columbia ABE Articulation Handbook (http://www.aved.gov.bc.ca/abe/docs/2015-16_abe_guide.pdf).

General Learning Outcomes:

Upon successful completion of this course, the student will:

1. Understand and be able to communicate the basic concepts of human anatomy, covering similar material to that of Yukon Biology 12.
2. Have the prerequisites, knowledge, and skills to enter science programs, especially those related to biological sciences such as a health programs or Renewable Resources.
3. Be able to enter, with confidence, a first-year biology course.
4. Have an appreciation of biology within the course context as well as related concepts, such as First Nations traditional knowledge and global biological issues.

Course Format:

1. There are approximately thirty-five scheduled 1 ½ -hour sessions generally consisting of:
 - review / topic introduction
 - viewing a presentation on the topic
 - lecture / discussion /notes
2. The laboratories consist of:
 - two three-hour sessions for Labs 2 & 3 via computer-assisted labs
 - one introductory microscopy lab (Lab 1) and one histology (tissue types – Lab 4) lab in the Biology Lab Room 2805. The Histology Lab will include a formal lab report.
 - Labs 5 - 9 will be held on consecutive afternoons during the week of March 29 – April 1, 2016. There will be no classes this week.

Assessments:

Attendance & Participation

It is the student's responsibility to attend all classes.

The following is an excerpt from the Yukon College Academic Regulations and Procedures (January 2000) manual from section 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.

Assignments:

1. After most of the **23 chapters**, an assignment is handed in (typewritten or word processed). It is the student's responsibility to be informed about expectations by reading the Student Manual.
2. After each of the **7 laboratories**, a lab assignment is handed in. **The lab part of the course must be passed to pass the course.** It is the student's responsibility to be informed about expectations by reading the Course Outline and the Student Manual.
3. Each student is required to complete a research **presentation**. The presentation format is open; for example, students may choose to do a research paper, an oral presentation, or a visual presentation. The topics chosen must be approved by the instructor.

Tests:

There are two examinations covering the contents as follows:

1. **Midterm Exam** - chapters 1-8, 23-26
2. **Final Exam** - All chapters covered in this course. The lecture part of the course (assignments and exams) must be passed to pass the course. It is the student's responsibility to be informed about all aspects of the exams and student assessment by reading the course outline.
3. Numerous **quizzes** will be written throughout the course; quiz marks may be recorded but will not contribute to students' evaluations. The quizzes are meant to be a learning tool.

Evaluation:

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

- Assignments 20%
- Labs 20%
- Presentation 5%
- Midterm Exam 25%
- Final Exam 30%

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

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%.

Required Textbooks and Materials

Required Textbook: Mader, S. & Windelspecht, M. (2014). Inquiry into Life (14th ed). The 13th edition may be used but students are responsible for any discrepancies between textbooks (eg. page numbers).

Required Additional Materials:

1. Yukon College Laboratory Manual (available at no extra cost as a printout).
2. Videotapes / DVDs / online videos for each chapter
3. Laboratory materials as required (dissection kits available in biology lab).

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

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.

Specific Learning Outcomes:

Methods and Concepts

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 scientific questions and distinguish them from other types of questions
- e. formulate hypotheses
- f. critique experimental results and write scientific reports
- g. discuss the effects of science and technology on society

Atoms and Molecules /The Cell /Diffusion

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. list the various types of chemical bonds and the circumstances under which each forms
- c. describe the essential chemistry and characteristics of water
- d. compare characteristics of acids, bases, and salts
- e. explain how small organic molecules are assembled into macromolecules by condensation, and how the reverse process is accompanied by hydrolysis
- f. identify the general structure of a monosaccharide, fatty acid, amino acid, and nucleic acid
- g. demonstrate an understanding of cell theory
- h. identify and describe the function of major cell components and relate structure

- to function
- i. distinguish between eukaryotic and prokaryotic cells
 - j. describe the essential role of DNA
 - k. define diffusion and relate its importance to biological processes
 - l. differentiate between passive and active transport

Energy-Acquiring and Energy-Releasing Pathways

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
- c. differentiate between aerobic respiration and anaerobic respiration
- d. explain the processes involved in the three stages of aerobic respiration
- e. know the raw materials and products of the processes of glycolysis, fermentation, the citric acid cycle, and electron transfer phosphorylation.

Meiosis

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

- a. compare mitosis and meiosis in terms of chromosome duplication and cell divisions
- b. describe the various phases of meiosis in terms of chromosome action and cytoskeletal elements
- c. explain what actually happens when fertilization occurs
- d. define various genetic terms including, but not limited to: gene, allele, dominance, homozygous, heterozygous, genotype, phenotype, karyotype

From DNA to Proteins

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

- a. relate the structure of nucleic acids to nucleotides and describe the components of nucleotides
- b. describe how DNA is replicated
- c. explain how the structure and behaviour of the three types of RNA determine the structure of polypeptide chains
- d. describe the nature of mutations and their role in genetic variation
- e. describe several ways and levels of gene activation and inactivation
- f. explain how operon controls regulate gene expression in prokaryotes
- g. differentiate recombinant DNA technology from genetic engineering
- h. describe how DNA can be cleaved, spliced, cloned and sequenced
- i. explain Mendel's Laws and how they relate to expected inheritance of traits
- j. differentiate between, and give examples of incomplete dominance and codominance
- k. explain and give examples of sex-linked inheritance

Animal Structure and Function

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

- a. list and describe various levels of organization (cells, tissues, organs, organ systems)
- b. describe characteristics of various tissue types, and provide examples
- c. describe sensory and motor neurons and interneurons in terms of structure and function
- d. explain how action potentials are propagated in neurons
- e. define chemical synapse and explain how neurotransmitters function
- f. outline the organization of the nervous system into central and peripheral, autonomic and somatic, and sympathetic and parasympathetic systems
- g. relate how specific sensory receptors relay signals from stimuli via the nervous system
- h. state the location and function of endocrine glands in the human body
- i. explain how the hypothalamus and pituitary gland work together to secrete hormones and regulate other endocrine glands
- j. list the functions of skin, and identify four cell types in vertebrate skin
- k. describe how ligaments, tendons, muscles and bones work together to move the human body
- l. describe the functions of smooth muscle and cardiac muscle
- m. explain how muscles contract, indicating the role of calcium, ATP and stimulus input
- n. relate the functions of the circulatory system and the lymphatic system
- o. describe cellular and plasma components of blood
- p. describe the path of blood flow in humans, indicating the significance of the pulmonary and systemic circuits, passage through various chambers of the heart, and movement through specific arteries, capillaries and veins to accommodate all organs and tissues of the body
- q. describe typical external barriers to invading organisms
- r. describe the processes involved in the nonspecific inflammatory response
- s. distinguish between antibody-mediated and cell-mediated defense patterns
- t. explain the mechanisms of immunological specificity and memory
- u. explain the basis for immunization
- v. compare the mechanisms used in various invertebrate & vertebrate systems
- w. explain the relation of the human respiratory system to the circulatory and nervous systems, and to cellular respiration
- x. list some diseases of the human respiratory system, and describe characteristics of these diseases
- y. compare incomplete and complete digestive systems, and relate how organisms ingest, digest and absorb nutrients from food
- z. list the structures and functions of various organs and regions of the human digestive system
- aa. list typical human nutritional requirements
- bb. explain how the chemical composition of extracellular fluid is maintained in mammals

- cc. list the components, and describe the function of the components, of the mammalian urinary system
- dd. describe the processes of urine formation and excretion
- ee. explain how heat gain and loss occurs, and how ectotherms, endotherms, and heterotherms maintain steady body temperatures
- ff. compare and contrast asexual and sexual reproduction in terms of processes, advantages and disadvantages
- gg. describe early embryonic development and distinguish between oogenesis, spermatogenesis, fertilization, cleavage, gastrulation, and organ development
- hh. list the structures, and describe the functions, of the human male and female reproductive systems
- ii. outline the principal events of prenatal development
- jj. explain the significance of cell differentiation and morphogenesis in the development of an organism