



COURSE OUTLINE

BIOL 060 INTRODUCTION TO BIOLOGY II

3 CREDITS

PREPARED BY: Stephen Biggin-Pound, Instructor

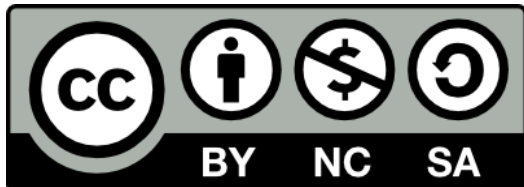
DATE: December 21, 2020

APPROVED BY: Andrew Richardson, Dean

DATE: January 4, 2021

APPROVED BY SENATE: Click or tap to enter a date

RENEWED BY SENATE: Click or tap to enter a date



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INTRODUCTION TO BIOLOGY II

INSTRUCTOR: Stephen Biggin-Pound	OFFICE HOURS: after class or by appointment
OFFICE LOCATION: A2105	CLASSROOM: Online
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TELEPHONE: 867.668.8796	DATES: January 4 th to April 22 nd , 2020

COURSE DESCRIPTION

This course covers cell structure and function, animal tissues, photosynthesis, respiration, animal nutrition, immunity, digestive, muscular, skeletal, and circulatory system, integument, excretion, homeostasis, nervous system and the senses, hormonal system and autonomic nervous system, reproduction and meiosis, stages of aging and basic molecular genetics.

PREREQUISITES

Biology 11 or Biology 050 or permission of the instructor.

RELATED COURSE REQUIREMENTS

Can insert detail if online course, or computer required

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.

LEARNING OUTCOMES

Upon successful completion of this course, the student will:

1. Meet the competencies as stated for ABE Advanced Level Biology as stated in the current edition of the B.C. Provincial Government's publication Adult Basic Education: A guide to Upgrading in British Columbia's Public Post-Secondary Institutions – An Articulation Handbook at <https://www.bctransferguide.ca/docs/ABE2020.pdf>.
2. Understand and be able to communicate the basic concepts of human anatomy, covering similar material to that of Yukon Biology 12.
3. Have the prerequisites, knowledge, and skills to enter science programs, especially those related to biological sciences such as a health programs or Renewable Resources.
4. Be able to enter, with confidence, a first-year biology course.

5. 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

The course is a scheduled, mixed synchronous and asynchronous online course with in-person labs.

Course lectures will be delivered online using Yukon University's Moodle learning management system and Zoom video conferencing application. In general, the schedule will be Monday classes as asynchronous online content, and Tuesday and Thursday classes as synchronous, live Zoom lectures.

Labs will take place in-person at Ayamdigut campus in Whitehorse.

Attendance & Participation

Attendance and participation in lectures will provide the best opportunity for success in the course. Synchronous Zoom lectures will be recorded should attendance not be possible. Attendance online is required for quizzes and exams.

Attendance in labs is required. Lab activities cannot be replicated, and lab assignments will be based on the activities undertaken and the data collected in the labs.

ASSESSMENTS:

Assignments

A series of Chapter Assignments will be assigned throughout the course, with assignments given approximately every 1-2 weeks. These assignments will help reinforce learning as we move through the wide-ranging material, and will consist of questions and reflections on the material presented in lectures and the textbook. Assignments and feedback will help prepare students for the written exams. The assignments will be worth 25% of the final mark in total, with each assignment weighted equally.

Each lab will have a lab assignment based on the activities and data collected in the lab. Students must pass the lab portion of the course in order to pass the course. Lab assignments are worth 25% of the final mark in the course.

A Research Assignment will give students an opportunity to explore a topic of their choice that is relevant to the course content. Topics must be approved by the instructor. Students may choose to complete a written report or a visual presentation. The report is worth 5%

of the final mark in the course.

Tests

There is one Midterm Exam, worth 20% of the final mark in the course.

There is a Final Exam, worth 25% of the final mark in the course.

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.

EVALUATION:

Assignments	25%
Labs	25%
Midterm Exam	20%
Research Assignment	5%
Final Exam	25%
Total	100%

REQUIRED TEXTBOOKS AND MATERIAL

Human Biology by Christine Miller.

This OER textbook is available at no cost for online viewing or download at:

<https://humanbiology.pressbooks.tru.ca/>

Students may choose to print a copy at their own expense. No printed copies will be available in the Yukon University Bookstore.

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 January 2020

& 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.

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

SPECIFIC LEARNING OUTCOMES

Methods and Concepts

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

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

It is expected that students will be able to:

- a. describe the pathways by which energy enters organisms and passes to other

- b. organisms and back into the environment
- c. outline the steps of light-dependent and light-independent reactions, including
- d. reactants and products of each phase
- e. differentiate between aerobic respiration and anaerobic respiration
- f. explain the processes involved in the three stages of aerobic respiration
- g. know the raw materials and products of the processes of glycolysis, fermentation, the citric acid cycle, and electron transfer phosphorylation.

Meiosis

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

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

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