

School of Academic and Skill Development



BIOL 060

Introduction to Biology II

Winter 2023

3 Credits

Course Outline

INSTRUCTOR	Denise Gordon	OFFICE HOURS	By appointment, please email
OFFICE	No office on campus	CLASSROOM	Lecture A2204, Lab A2805
E-MAIL	dgordon@yukonu.ca	CLASS TIME	Lecture T/R 1:00-2:20 Labs: See schedule posted on Moodle
TELEPHONE		CRN	20024
Liberal Arts office: Ayamdigut Campus A2501, liberalarts@yukonu.ca, 867-668-8770			

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.

COURSE REQUIREMENTS

Prerequisite(s): Biology 11 or Biology 050 or permission of the instructor.

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.

Students are reminded that it is always the receiving institution that determines whether a course is acceptable as an applicable, equivalent course or if it may be transferred to their program for credit. Find further information at: <https://www.yukonu.ca/admissions/transfer-credit>

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.

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.

COURSE FORMAT

Delivery format

This course is delivered on campus, in person. Students are expected to attend class and may be required complete assignments and/or activities online or individually.

There are approximately thirty scheduled sessions generally consisting of: review / topic introduction, viewing videos and/or online content, lecture, and/or discussion. The laboratories consist of eight, three-hour sessions.

WORKLOAD

Lectures

There are two, 1.5 hour lectures a week. Students should expect up equal reading hours to prepare for each lecture

Laboratory

There are 8, three-hour laboratory sessions throughout this course. Students should expect up to equal hours to for pre and post laboratory assignments and reports.

Assignments

There are 6 assignments. Students should expect to spend at least three hours on each assignment.

EVALUATION

Laboratory

Students must attend the laboratory sessions to submit a report. Students arriving late to a laboratory session may be refused entry. 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. Students must pass the lab portion of the course to pass the course. Lab assignments are worth 25% of the final mark in the course.

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.

Seminar

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.

Exams

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 if the student faces an emergency. Some form of documentation of the emergency may be required.

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

TEXTBOOKS & LEARNING MATERIALS

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.

Yukon University Laboratory Manual and Laboratory Kit

COURSE WITHDRAWAL INFORMATION

Students may officially withdraw from a course or program without academic penalty up until two-thirds of the course contact hours have been completed. Specific withdrawal dates vary, and students should become familiar with the withdrawal dates of their program. See withdrawal information at www.yukonu.ca/admissions/money-matters

Refer to the YukonU website for important dates: www.yukonu.ca/admissions/important-dates

Refunds may be available. See the Refund policy and procedures at www.yukonu.ca/admissions/money-matters

ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures (updated bi-annually) for further details about academic standing, and student rights and responsibilities: www.yukonu.ca/policies/academic-regulations

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 at www.yukonu.ca/policies/academic-regulations)

It is the student's responsibility to seek these accommodations by contacting the Learning Assistance Centre (LAC): LearningAssistanceCentre@yukonu.ca.

TOPIC OUTLINE

SPECIFIC LEARNING OUTCOMES

Methods and Concepts

It is expected that students will be able to:

- describe the hierarchy of organization, from atoms and molecules through cells to the biosphere
- describe the characteristics of living organisms which distinguish them from non-living things
- make detailed observations about the natural world
- formulate scientific questions and distinguish them from other types of questions
- formulate hypotheses
- critique experimental results and write scientific reports
- discuss the effects of science and technology on society

Atoms and Molecules /The Cell /Diffusion

It is expected that students will be able to:

- explain how the distribution of electrons in an atom or an ion determines the number and kinds of chemical bonds that can be formed
- list the various types of chemical bonds and the circumstances under which each forms
- describe the essential chemistry and characteristics of water
- compare characteristics of acids, bases, and salts
- explain how small organic molecules are assembled into macromolecules by condensation, and how the reverse process is accompanied by hydrolysis
- identify the general structure of a monosaccharide, fatty acid, amino acid, and nucleic acid
- 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 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

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 behavior 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