



COURSE OUTLINE

Biology 050

Introducing Biology

87.5 HOURS

3 CREDITS

PREPARED BY: _____ DATE: _____
Instructor

APPROVED BY: _____ DATE: _____
Dean, Applied Science & Management

YUKON COLLEGE

July 2013

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Course Outline prepared by Gerald Haase, July 2013

Yukon College
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Introducing Biology

INSTRUCTOR: Gerald Haase

OFFICE HOURS: Wednesdays 1:00 – 3:00
OFFICE LOCATION: Room A2718

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COURSE OFFERING September 5, 2013 to December 12, 2013
DAYS & TIMES: Lectures: Monday, Tuesday, and Friday 1:00 p.m. to 2:25 p.m.
Labs: Monday: 1:00 p.m. to 4:00 p.m.

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. Biology 050 is articulated with B.C. and Alberta college Advanced Biology courses and will allow students to enter Biology 060, which could lead to a first-year university biology course.

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 ABE in BC Articulation Handbook <http://www.aved.gov.bc.ca/abe/docs/handbook.pdf>
2. Understand and be able to communicate the basic concepts of biology covering similar material to that of Yukon Biology 11.
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 DVDs / videotapes / online content
 - lecture / discussion / notes
2. The laboratories consist of eight 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.*

PREREQUISITES:

Sixty-five percent (65%) in high school science (grade 10), or Yukon College Science 040 including units in Human Biology and Introductory Chemistry, or permission of the instructor. Students may be asked to demonstrate writing skills. *English 040 is recommended.*

COURSE REQUIREMENTS/EVALUATION:

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.

Electronic Devices

In order to be successful in classes and minimize distractions for others, cell phones, iPods and other electronic devices must be turned off while students are in class. In an emergency situation, the instructor may give a student permission to use a cell phone or pager.

Appropriate Language

In all areas of the college environment, students are responsible to show respect for others, swearing, or language that is discriminatory or derogatory in relation to race, sex, ethnic background, religious beliefs, age and physical condition is not appropriate.

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 8 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 APA 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

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.

Plagiarism

Plagiarism involves representing the words of someone else as your own, without citing the source from which the material is taken. If the words of others are directly quoted or paraphrased, they must be documented according to standard procedures (APA). The resubmission of a paper for which you have previously received credit is considered a form of plagiarism.

Plagiarism is academic dishonesty, a serious academic offence, and will result in you receiving a mark of zero (F) on the assignment or the course. In certain cases, it can also result in dismissal from the college.

STUDENTS WITH DISABILITIES OR CHRONIC CONDITIONS:

(NOTE: This statement must be in each course outline.)

Reasonable accommodations are available for students with a documented disability or chronic condition. It is the student's responsibility to seek these accommodations. If a student has a disability or chronic condition and may need accommodation to fully participate in this class, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

REQUIRED TEXTBOOKS/MATERIALS:

Mader, Sylvia, *Inquiry Into Life, 13th Edition*

Yukon College Laboratory Manual (supplied to students via course fees)

One videotape or DVD for each chapter (available for use at the campus)

Laboratory materials as required (available for use at the campus)

EQUIVALENCY/TRANSFERABILITY:

Yukon College Biology 050 is articulated as Advanced Biology in the Adult Basic Education system (ABE) in British Columbia, Alberta and the Yukon. For more information see the 2012 Articulation Guide at <http://bctransferguide.ca/>

ABE Advanced Biology is deemed equivalent to the British Columbia Ministry of Education course Biology 11. For more information see page 18 of the A.B.E. Articulation Handbook or the beginning of Chapter 2 of the British Columbia Ministry of Education Handbook of Procedures <http://www.bced.gov.bc.ca/exams/handbook/>

Biology 050 covers the Core Topics for Biology: Advanced Level set out in A.B.E. in B.C. Articulation Handbook <http://www.aved.gov.bc.ca/abe/docs/handbook.pdf>

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 scientific questions and distinguish them from other types of questions
- e. formulate hypotheses
- f. design and conduct experiments
- g. critique experimental results and write scientific reports
- h. 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:

- explain how the distribution of electrons in an atom or an ion determines the number and kinds of chemical bonds that can be formed
- 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
- identify and describe the function of major cell components and relate structure to function
- distinguish between eukaryotic and prokaryotic cells
- describe the essential role of DNA
- define diffusion and relate its importance to biological processes
- 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:

- describe the pathways by which energy enters organisms and passes to other organisms and back into the environment
- 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 (Punnet 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. differentiate between beneficial and harmful bacteria
- m. explain how bacteria become resistant to antibiotics
- n. describe general characteristics of protists
- o. differentiate between various protistan phyla and give examples of each
- p. compare and contrast a prokaryotic cell to a eukaryotic cell
- q. discuss protists as beneficial and harmful to humans
- r. discuss the possible origin of multicellularity
- s. describe general features of Fungi and list characteristics that distinguish them from organisms in the other kingdoms
- t. name the Fungi divisions and list their distinguishing characteristics
- u. describe lichens and their ecological importance
- v. explain how fungi are ecologically and commercially important
- w. 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
- describe how plants from each of the major divisions meet their metabolic needs

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

- b. list the basic life processes that all animals must perform
- c. name the major phyla, and list distinguishing features of each
- d. describe adaptations of representatives of selected phyla to their environments
- e. discuss trends in the evolution of animals, including levels of tissue organization, symmetry, and system development
- f. describe the ecological and economic significance of selected animals
- g. describe how selected representatives of major phyla perform the basic life processes
- h. demonstrate safe dissection techniques
- i. demonstrate effective field observation techniques of selected animals
- j. distinguish between invertebrates and vertebrates and describe the vertebrate classes

Theory of Evolution

- Early Theories
- Darwin
- Theory for and Evidence of 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
- Nutrients
- Food Chains, Energy Flow
- Habitat and Niche
- Populations and Communities
- Biomes

Human Ecology

- Human Economies
- Population

- Environmental Problems
- Conservation

Animal Behaviour

- Ethnology
- Genetic Basis of Behaviour
- Innate and Learned Behaviours

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

- define: ecology, biosphere, biomes, ecosystem, community, population
- describe the four components of the planetary ecosystem (living organisms, solid earth, atmosphere and water) and describe interactions within and between them
- describe the flow of energy through the biosphere
- explain cycling of biochemical materials through an ecosystem
- describe major biomes and list examples of organisms native to each
- describe ecological succession and apply the concept to disturbed and managed ecosystems
- compare exponential and logistic population growth.
- relate population growth to environmental carrying capacity
- describe limiting factors which control population growth
- 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
- discuss solutions to local and global ecological issues, and identify local and global environmental successes
- outline costs and benefits of group living versus individual or small group units
- relate animal behaviours to endocrine and nervous system functions
- discuss the importance of adaptive behaviour
- describe how successful behaviours evolve
- describe major types of behaviour
- define communication behaviour and list ways in which animals communicate
- discuss the roles of learning and genes in behaviour