Douglas College

EFFECTIVE: SEPTEMBER 2003

CURRICULUM GUIDELINES

A: Division: **Science and Technology**

B: Department/ Program Area: **Biology**

Date: **May 2002**

New Course | | Revision | **X**

If Revision, Section(s) Revised: **F, G, H, K, O, P, Q, R**

Date Last Revised: **Jan. 15, 2001**

C: **BIOLOGY 210** (Subject & Course No.) **D:** **Principles of Biology: the Organism** (Descriptive Title) **E:** **5** (Semester Credits)

F: Calendar Description:
This course examines the detailed microscopic structure and biochemical functioning of living organisms. Mechanisms of inheritance and evolution are also studied. With Biology 110, this course fulfills the requirements of a first year university Biology course.

G: Allocation of Contact Hours to Types of Instruction/Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:
Lecture, Tutorial, Laboratory

Number of Contact Hours: (per week / semester for each descriptor)
Lecture/Tutorial 4 hours/week
Laboratory 3 hours/week

Number of Weeks per Semester:
14

H: Course Prerequisites:
BIOL 110 with a C- or better, or permission of instructor

I. Course Corequisites:
None

J. Course for which this Course is a Prerequisite:(with BIOL 110)
BIOL 300, 301, 302, 320, 321, 322

K. Maximum Class Size: 35

L: PLEASE INDICATE:

[ ] Non-Credit

[ ] College Credit Non-Transfer

[X] College Credit Transfer: Requested [ ] Granted [X]

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS (www.bccat.bc.ca)

M: Course Objectives/Learning Outcomes

Upon completion of this course, students will:

1. Understand and be able to explain the relationship between genetics and evolution.

2. Be able to explain cell division in plants and animals, and to describe the significance of mitosis and meiosis to growth, development and reproduction.

3. Be capable of solving monohybrid and dihybrid problems, and problems involving multiple alleles and sex-linked genes.

4. Be able to explain the molecular basis and significance of proteins, nucleic acids, lipids and carbohydrates, and their relationship to cellular respiration and photosynthesis and general metabolism.

5. Be able to explain how DNA and RNA replicate and code for proteins, and analyse problems using the genetic code.

6. Understand and be able to explain how genes interact with the environment, and the role of mutations, meiosis and fertilization in changing the genetic composition of populations over time.

7. Be able to discuss the mechanisms of evolution, and to apply evolutionary concepts to the analysis of current environmental problems.

8. Be capable of conducting simple directed experiments and explaining the procedures and results.

9. Understand and be able to use biological principles in the discussion of current issues.

N: Course Content

The major topics in the course include the following:

1. Introduction to Genetics and Evolution
   - mitosis
   - meiosis
   - Mendelian Inheritance: theory and problems
   - Non-Mendelian Inheritance: multiple alleles, sex linkage and multigenic inheritance
   - experiments using *Drosophila*: how to differentiate an autosomal character from a sex-linked character.
   - preparation of plant tissue for microscopic chromosome analysis.
2. Molecular Basis of Life
   - basic chemical formula of amino acids
   - formation of primary, secondary, tertiary and quaternary structure of proteins.
   - functions and mechanisms of action of enzymes
   - functions and structures of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)
   - replication of DNA
   - cellular synthesis of proteins
   - molecular and chromosomal basis of mutations
   - structure and functions of cellular organelles
   - structure and function of biologically important lipids
   - models of membrane structure and transport of materials across membranes
   - structure and function of biologically important carbohydrates
   - biochemical tests for carbohydrates, lipids and proteins
   - lab analysis of enzyme action and optimum pH
3. Conversion and Use of Energy by Cells
   - location and process of cellular respiration
   - catabolic pathways and interrelationships for carbohydrates, fats and proteins
   - significance of ATP
   - location and process of photosynthesis
     - light dependent reactions
     - light independent reactions
   - technique of paper chromatography for the separation of leaf pigments
4. Plant and Animal Growth and Development
   - mechanisms by which seed plants reproduce
   - process of double fertilization
   - results of fertilization: growth of seeds
   - role of soil in plant growth and development, including impact of acid rain
   - role of plant hormones and the photoreceptor phytochrome on plant growth and development
   - gibberellic acid experiment: role in development of pea plants
   - process of animal fertilization
   - stages of development following fertilization
   - significance of primary germ layers
   - sea urchin fertilization
5. Origin and Evolution of Life
   - scientific theories with respect to how life arose on earth
   - origin of prokaryotic and eukaryotic cells
   - types of evolution
   - Lamarck's theory of evolution
   - Darwin-Wallace theory of evolution by natural selection
   - sources of heritable variation within a species
   - meaning and role of fitness in evolution
   - types of natural selection
   - role of isolating mechanisms in speciation

O: Methods of Instruction

This course involves four hours of lecture/tutorial/week and three hours of laboratory work. The information content is integrated with laboratory experiments, problem sets and textbook readings.

P: Textbooks and Materials to be Purchased by Students

Campbell, Neil A., and Jane B. Reece. 2002. **Biology,** 6th Edition. Benjamin Cummings

Douglas College produced manual. **Biology 210: the Organism**.

Q: Means of Assessment

TYPE OF EVALUATION		POINTS
Class Tests and Assignments		20
Laboratory Reviews (see note 2 below)		*(up to -22)*
Laboratory Examination		15
Comprehensive Examinations	-midterm	30
	- final	35
	TOTAL	100

GRADES:	**A+ 95-100**	**A 90-94**	**A- 85-89**	**B+ 80-84**	**B 75-79**	
	B- 70-74	**C+ 65-69**	**C 60-64**	**C- 55-59**	**P 50-54**	**F 0 - 49**

Notes:

1. Laboratory Reviews:
   Required laboratory reviews will be assigned in most weeks, and these reviews must be completed in the laboratory in the week that they are assigned. The laboratory reviews are intended to provide an opportunity to review particular material with each student. Completion of the review will result in a grade of P (Pass), or R (Review Recommended) being marked on the laboratory card. If **more than one review** is not completed satisfactorily, (P or R), **two marks will be deducted from the course total for each lab review in excess of one that is not completed.** A student **must complete 50% of the reviews to pass the course**.
2. Comprehensive Examinations:
   There will be one midterm in week 7. The final examination will cover the entire course. If the student achieves a higher mark on the final than on the mid-term, the mid-term grade will be raised to equal that achieved on the final examination.

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

There is no provision for PLAR, other than that normally done by examining transcripts and comparing course outlines of biology courses taken within the last 5 years to the course content of Biology 210.

Course Designer(s)

Education Council/Curriculum Committee Representative

Dean/Director

Registrar