Douglas College

EFFECTIVE: SEPTEMBER 2001

CURRICULUM GUIDELINES

A: Division: **Science and Technology**

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

Date: **15 January 2001**

New Course [ ]

Revision [X]

If Revision, Section(s) Revised: **A,B,F,G,J,M,N,O,P,Q**

Date Last Revised: **April 1977**

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

F: Calendar Description:
The second half of a two semester course. It deals with the detailed microscopic structure and biochemical functioning of a living organism. Mechanisms of inheritance and evolution are also studied.

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

Primary Methods of Instructional Delivery and/or Learning Settings:
Seminar, Lecture, Audio/transcript, Student Directed Learning, Laboratory

Number of Contact Hours: (per week / semester for each descriptor)
Seminar/lecture 2 hours/week
Audio/transcript, student directed learning 2 hours/week
Laboratory 3 hours/week

Number of Weeks per Semester:
14

H: Course Prerequisites:
BIOL 110 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: 20

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 determining an answer to one and two gene problems of genes governed by Mendel's Laws, to problems involving multiple alleles and sex-linked genes.

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

5. Be able to explain how DNA replicates the role of DNA, mRNA, tRNA and rRNA in protein synthesis; and be able to analyze problems using the genetic code.

6. Understand and be able to explain how genes interact with the environment, and be able to describe the roles 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.

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

9. Understand and be able to explain how the biological concepts studied in this course may be applied to an analysis of contemporary biological issues..

N: Course Content

The major topics in the course include the following:

1. Introduction to Genetics and Evolution
   - mitosis
   - meiosis
   - Mendelian Inheritance
   - 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
   - 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
   - models of membrane structure and transport of materials across membranes
   - structure and function of biologically important carbohydrates
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 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 seed
   - 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 and early development
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 two hours of lecture/seminar/week, two hours of student directed learning (audio/transcript) and three hours of laboratory work. The information content is integrated with laboratory experiments, problem sets, transcripts, journal articles and textbook readings.

P: Textbooks and Materials to be Purchased by Students

Campbell, Neil A., Jane B. Reece and Lawrence G. Mitchell. 1999. **Biology,** 5th Edition. Addison Wesley Longman, Inc.

Douglas College produced manual. **Biology 210: the Organism**. Fall 2000

Q: Means of Assessment

TYPE OF EVALUATION		POINTS
Weekly Class Evaluations		30
Laboratory Evaluations (see note 2 below)		
Laboratory Examination		10
Comprehensive Examinations	-midterm	30
	- final	30
	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- 55-59** **P 50-54** **F 0 - 49**

Notes:

1. Weekly Class Evaluations:
   Each week, there will be written evaluations in class based on the learning outcomes and other material covered in the previous week. There will normally be 10 weekly evaluations and the best 9 out of 10 evaluations will be averaged to determine this portion of the grade.
2. 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), **one mark will be deducted from the course total for each lab review in excess of one that is not completed.**
3. Comprehensive Examinations:
   The final examination will cover the entire course. If the student achieves a better grade on the final exam than on the mid-term examination, the mid-term grade will be raised to equal that achieved on the final examination.
4. Spelling:
   Errors in spelling may result in lost marks, up to a maximum of 5% of each class evaluation, laboratory examination or comprehensive examination.

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

At the moment, there is no provision for PLAR, other than that normally done by comparing transcripts of Biology courses taken within the last 5 years at other institutions to those offered at Douglas.

Course Designer(s)	Education Council/Curriculum Committee Representative
Dean/Director	Registrar