BIOL 120 - General Biology Course Outline

Approval Date: 09/12/2019
Effective Date: 06/08/2020

SECTION A

Unique ID Number	CCC000253032
Discipline(s)	Biological Sciences
Division	Science and Engineering
Subject Area	Biology
Subject Code	BIOL
Course Number	120
Course Title	General Biology
TOP Code/SAM Code	0401.00 - Biology, General / E - Non-Occupational
Rationale for adding this course to the curriculum	Updating textbook author and edition. Top code added
Units	4
Cross List	*N/A*
Typical Course Weeks	18

Total Instructional Hours

	Contact Hours
Lecture	54.00
Lab	54.00
Activity	0.00
Work Experience	0.00
Outside of Class Hours	108.00

Total Contact Hours	108
Total Student Hours	216
Open Entry/Open Exit	No
Maximum Enrollment	
Grading Option	Letter Grade or P/NP
Distance Education Mode of Instruction	On-Campus

SECTION B

General Education Information:

SECTION C

Course Description

Repeatability	May be repeated 0 times
Catalog Description	Study of the basic principles of biology on the molecular and cellular levels with emphasis on macromolecules of life, organelle structure and function, cellular

metabolism, cellular reproduction, Mendelian and molecular genetics. Intended primarily for biology majors or students requiring a molecular/cellular interpretation of life.

Schedule Description

SECTION D

Condition on Enrollment

1a. Prerequisite(s)

- CHEM 120 with a minimum grade of C or better

1b. Corequisite(s): *None*

1c. Recommended: *None*

1d. Limitation on Enrollment: *None*

SECTION E

Course Outline Information

1. Student Learning Outcomes:

A. Communicate scientific information effectively through written or oral means
B. Demonstrate a proficiency of knowledge in molecular biology and genetics

2. Course Objectives: Upon completion of this course, the student will be able to:

A. Identify and give examples of the characteristics common to all living organisms; evaluate and analyze which characteristics viruses and prions share with living organisms.
B. Discuss levels of organization in living and non-living systems.
C. Describe the basic cell structures and their functions in eukaryotic plant and animal cells; compare and contrast these with prokaryotic cells.
D. Understand and describe principles of chemical bonds and reactions as they relate to the major classes of biological molecules.
E. Review metabolic processes including cellular respiration, fermentation and photosynthesis.
F. Describe mechanisms of cell membrane permeability and transport, and critically evaluate by theory and experimental analysis which molecules can freely pass through the membrane.
G. Demonstrate skill in use of compound microscopes with prepared and wet mount slides of cells and organisms.
H. Analyze the results of data collected from laboratory experiments performed by the class and relate these results to appropriate scientific theories and hypotheses developed at the start of the experiment. Be able to clearly write hypotheses, results, and conclusions of the experiments.
I. Recognize under the microscope and describe the stages of mitosis in plant and animal cells. Compare and contrast mitosis with meiosis.
J. Understand the unifying principles of classical and modern genetics and apply these principles in predicting the outcome of genetic crosses.
K. Describe the process of protein synthesis including gene expression and regulation.
L. Relate evolutionary processes to the origin and evolution of cells.
M. Describe the mechanisms of DNA replication and cell division in prokaryotic and eukaroytic organisms.
N. Critically evaluate and write a review of current scientific literature.
O.

3. Course Content

Lecture content includes:

A. Characteristics of life
B. Scientific method
C. Levels of organization
D. Biological chemistry
    a. Principles of chemical bonds and reactions
    b. Properties and the importance of water
    c. Structure and functions of biological molecules (Proteins, lipids, carbohydrates, nucleic acids)
E. Membrane structure and function
F. Cellular transport
G. Structure and functions of prokaryotic and eukaryotic cells
H. Cellular organelles structure and functions
I. Cell communication
J. Energy and metabolism
    a. Enzymes
    b. Cellular respiration
    c. Fermentation
    d. Photosynthesis
K. Cell Cycle
    a. DNA replication
    b. Cell division and its regulation
    c. Protein Synthesis
    d. Gene structure, expression and regulation
L. Genetics
    a. Mendelian genetics
    b. Molecular genetics
    c. Genetic disorders
    d. Genes and development
M. Viruses
N. Bacteria
O. Protists
P. Biotechnology
Q. Theories on the origin of life including endosymbiosis
R. Overview of evolution

Laboratory content includes:

A. Proper use of the microscope
B. Performing metric conversions and dilutions
C. Measuring volumes and weights
D. Detecting biological molecules in food items
E. Observing cells and membrane sacs in varying osmotic conditions
F. Staining plant and animal cells to observe organelles
G. Identifying tissue types using histological slides
H. Performing quantitative analysis using a spectrophotometer
I. Identifying live and prepared protists

J. Observing cells undergoing mitosis
K. Determining the elements required for photosynthesis to occur
L. Culturing and observing bacterial cells
M. Presenting oral reports
N. Writing written scientific lab reports
O. Exploring the topic of evolution and natural selection
P. Discussing current scientific literature
Q.

4. Methods of Instruction:

Discussion:
Experiments:
Lab:
Lecture:

5. Methods of Evaluation: Describe the general types of evaluations for this course and provide at least two, specific examples.

Typical classroom assessment techniques

Exams/Tests --
Papers --
Oral Presentation --
Home Work --
Lab Activities --
Final Exam --

Additional assessment information:

Lecture Exams
Lab Practical Exams
Laboratory Reports

Example 1: The first lecture exam will cover the characteristics of living organisms, taxonomic classification, the scientific method, chemical bonds, the properties of water, and biological molecules.

Example 2: the first laboratory practical exam will cover the metric system, osmolarity, quantitative analysis using linear regression, qualitative analysis of biological molecules in food items.

Letter Grade or P/NP

6. Assignments: State the general types of assignments for this course under the following categories and provide at least two specific examples for each section.

A. Reading Assignments
Reading assignments from the textbook, laboratory manual and relevant research articles.

Example 1: Read chapter 5 of the textbook as preparation for the lecture on the cell membrane

Example 2: Read the scientific review article on cell signaling

B. Writing Assignments
Mathematical calculations and statistical analysis of lab data.
Laboratory reports

Example 1: Write a laboratory report on the photosynthesis experiment, including an abstract, introduction, methods, results, discussion and conclusion sections.
Example 2: Solve chemistry problems including metric conversions.

C. Other Assignments
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7. Required Materials

A. EXAMPLES of typical college-level textbooks (for degree-applicable courses) or other print materials.

Book #1:

Author:	Urry, L. A. et. al.
Title:	Campbell Biology
Publisher:	Pearson
Date of Publication:	2017
Edition:	11th

Book #2:

Author:	Raven, P. et al.
Title:	Biology
Publisher:	McGraw Hill
Date of Publication:	2014
Edition:	10th

Manual #1:

Author:	NVC Biology Department
Title:	BIOL-120 Lab Manual
Publisher:	Napa Valley College
Date of Publication:	01-01-2019

B. Other required materials/supplies.