BIOL 120 - General Biology Course Outline

Approval Date:
Effective Date:

SECTION A
Unique ID Number CCC000253032
Discipline(s) Biological Sciences
Division Science, Mathematics and Engineering
Subject Area Biology
Subject Code BIOL
Course Number 120
Course Title General Biology
TOP Code/SAM Code 0401.10 - Biology / E - Non-Occupational
Rationale for adding this course to the curriculum Updating textbook author and edition. Top code added
Units 4
This Course Is AA/AS Degree
Cross List N/A
Typical Course Weeks 18

Total Instructional Hours

<table>
<thead>
<tr>
<th>Contact Hours</th>
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<tbody>
<tr>
<td>Lecture</td>
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<tr>
<td>Lab</td>
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<tr>
<td>Activity</td>
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<tr>
<td>Work Experience</td>
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Outside of Class Hours 108.00

Total Contact Hours 108

Total Student Hours 0.00

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:
NVC General Education:
  A - Natural Sciences
  D3 Communication and Analytical Thinking
CSU GE Area B: Physical and its Life Forms (mark all that apply):
  B2 - Life Science
  B3 - Laboratory Sciences
IGETC Area 5: Physical and Biological Sciences (mark all that apply):
  B: Biological Science with a Lab

SECTION C

Course Description
Repeatability May be repeated 0 times
Catalog Study of the basic principles of biology on the molecular and cellular levels with
Description 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.

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 eukaryotic organisms.
N. Critically evaluate and write a review of current scientific literature.

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
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

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.