

Course discipline/number/title: BIOL 1220: General Biology I

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 2 lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences, Goal 10/People and the Environment

B. COURSE DESCRIPTION: This course is one of two introductory courses in biology. It is a cellular-based approach to the foundational principles of biology, and it addresses basic life processes at molecular, cellular, tissue, and organismal levels, principles of evolution, and interactions among organisms.

C. DATE LAST REVISED (Month, year): October, 2020

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Science and Experimentation
 - a) Foundational terminology in biology and science
 - b) Scientific method
 - c) Characteristics of experimentation
2. The Cellular Basis of Life
 - a) Characteristics of living organisms
 - b) Chemical foundations for cells
 - c) Carbon compounds in cells
 - d) Cell structure and function
 - e) Membrane transport
 - f) Metabolism
 - i. Photosynthesis
 - ii. respiration
 - iii. enzymes
3. Principles of Inheritance
 - a) Cell division and mitosis
 - b) Meiosis
 - c) Patterns of inheritance
 - d) human genetics
 - e) DNA structure and function
 - f) Protein synthesis
 - g) Control of gene expression
 - h) Recombinant DNA and genetic engineering
4. Principles of Evolution
 - a) Emergence of evolutionary thought
 - b) Modes of evolution and speciation
5. Ecological Concepts
 - a) The biosphere
 - b) Population, communities, ecosystems

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Define and apply comprehensive biological terminology.
2. Compare, contrast, and describe cell structure and function of living organisms.
3. Evaluate and compare types of cell reproduction processes and genetic outcomes of them.
4. Differentiate DNA, RNA, and proteins and each one's role(s) in cell division and/or gene expression.

- E. **LEARNING OUTCOMES (GENERAL):** The student will be able to: Continued. . .
5. Explain and describe the principles of evolution and its underlying causes.
 6. Describe and analyze ecological relationships among organisms and their environments.
- F. **LEARNING OUTCOMES (MNTC):**
- Goal 3/Natural Sciences: The student will be able to:
1. Demonstrate understanding of scientific theories.
 2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, student's laboratory experience in the collection of data, it's statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
 3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
 4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.
- Goal 10/People and the Environment: The student will be able to:
1. Explain the basic structure and function of various natural ecosystems and of human adaptive strategies within those systems.
 2. Describe the basic institutional arrangements (social, legal, political, economic, religious) that are evolving to deal with environmental and natural resource challenges.
 3. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
 4. Propose and assess alternative solutions to environmental problems.
 5. Articulate and defend the actions they would take on various environmental issues.
- G. **METHODS FOR EVALUATION OF STUDENT LEARNING:** Methods may include but are not limited to:
1. Objective and short answer exams
 2. Essay Exams
 3. Class-related projects and papers
 4. Lab experiments
 5. Lab reports
 6. Group presentations
 7. Skill performance
- H. **RCTC CORE OUTCOME(S).** This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. **SPECIAL INFORMATION (if any):**
1. The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of any materials used during the lab are discussed. In addition, if the lab involves any potentially infectious material, the students will be instructed on the proper use and disposal. The instructor will direct all students to wear necessary protective equipment while working with any hazardous chemicals. Safety Data Sheets for chemicals used are available online.
 2. Field lab work may also be part of this course, so students may be outside for some lab activities.