

Course discipline/number/title: BIOL 2920: General Biology I: Honors

A. CATALOG DESCRIPTION

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

This course is one of two introductory courses in biology, offered as an honors course with more development and detailed 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. One of Phi Theta Kappa's Honors Study Topic themes will unite topics covered in a traditional general biology course such as science and experimentation, cellular structure and function, genetics and inheritance, evolution, and ecology. Through an examination of primary scientific literature and the completion of a multifaceted, original research project, emphasis will be placed on the critical analysis and integration of biological concepts as they connect to the selected theme. This course is the Honors Equivalent of BIOL 1220.

B. DATE LAST REVISED (Month, year): February, 2018

C. OUTLINE OF MAJOR CONTENT AREAS:

1. Introduction to the selected Phi Theta Kappa Honors Study Topic
2. Science and Experimentation
  - a) Foundational terminology in biology and science
  - b) Scientific method
  - c) Characteristics of experimentation
  - d) Conducting and communicating research in biology
3. 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
4. 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
5. Principles of Evolution
  - a) Emergence of evolutionary thought
  - b) Modes of evolution and speciation
6. Ecological Concepts
  - a) The biosphere
  - b) Population, communities, ecosystems

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

1. Articulate the application/relevance of the Phi Theta Kappa Honors Study topic across biological concepts.
2. Define and apply comprehensive biological terminology.
3. Compare and contrast cell structure of living organisms.

- D. **LEARNING OUTCOMES (GENERAL):** The student will be able to: Continued. . .
4. Describe and interpret the principles of cell function, such as membrane transport and anabolic and catabolic reactions.
  5. Evaluate and compare types of cell reproduction processes and genetic outcomes of them.
  6. Differentiate DNA, RNA, and proteins and each one's role(s) in cell division and/or gene expression.
  7. Explain and describe the principles of evolution and its underlying causes.
  8. Describe and analyze ecological relationships among organisms and their environments.
  9. Apply research methods in biology.
  10. Communicate all sections of a research report utilizing APA writing standards.
- E. **LEARNING OUTCOMES (MNTC):**  
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, and 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.
- F. **METHODS FOR EVALUATION OF STUDENT LEARNING:**  
Methods may include but are not limited to:
1. Objective, short answer, and/or essay exams
  2. In-class participation/discussion
  3. Lab experiments
  4. Lab reports
  5. Research project
  6. Research paper
  7. Presentation
  8. Skill performance
- G. **RCTC CORE OUTCOME(S) ADDRESSED:**  
Communication. Students will communicate appropriately for their respective audiences.
- Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- H. **SPECIAL INFORMATION (if any):**
1. Compared to BIOL 1220, this Honors Course will integrate Phi Theta Kappa's most recent Honors Study Topic, will rely on primary scientific literature, and will require that students complete an original research project.
  2. 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. A copy of Safety Data Sheets for chemicals used is available in the lab.