

Course discipline/number/title: BIOL 1101: Elements of Biology

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 2 lecture, 2 lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences, Goal 9/Ethical and Civic Responsibility

B. COURSE DESCRIPTION: A one-semester course for non-science majors that blends traditional and contemporary biological concepts for understanding life in today's world. Science and the scientific method, the nature of life, cell structure and function, cell reproduction, genetic inheritance, human genetic analysis, biotechnology, and evolution are covered. Students will evaluate ethical issues of some biological, genetic, and biotechnology applications. This course will serve as an introduction to cellular biology to prepare for further study in biology-related or health-related fields. Lab attendance is mandatory.

C. DATE LAST REVISED (Month, year): March, 2019

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Scientific Method
  - a) Scientific theory, hypothesis, facts
  - b) Characteristics of scientific experiments
  - c) Peer-review
2. Identifying pseudoscience
3. Cell Biology
  - a) Basic chemical principles
  - b) Molecules of life
  - c) Cells-basic unit of life
  - d) Molecular transport
  - e) Cell metabolism
  - f) Mitosis and the cell cycle
4. Principles of Inheritance
  - a) Meiosis
  - b) Sexual reproduction in plants and animals
  - c) Mendelian inheritance
  - d) Pedigree analysis
5. Human Genetics
  - a) Genetics of human conditions
    - i. Inheritance problem solving
    - ii. Applications for diagnostics and treatments
  - b) Current issues in the use of the technology of human genetic analysis
    - i. Examine, articulate and apply their own ethical views to situations involving information about genetic conditions.
    - ii. Analysis of the ethical dimensions of the use of the knowledge, and applications of an individual's genetic information with respect to political, economic and sociological consequences.
6. Molecular Biology
  - a) DNA structure and function
  - b) Gene expression (from DNA to protein)
  - c) Biotechnology
    - i. Processes and purposes
    - ii. Issues, controversies
7. Principles of Evolution
  - a) Population genetics
  - b) Variation and natural selection
8. Topics in Environmental Biology-optional by instructor

- E. **LEARNING OUTCOMES (GENERAL):** The student will be able to:
1. Define and apply the vocabulary of science and biological systems.
  2. Explain and apply the principles of the chemistry of life.
  3. Compare, contrast, and describe the basic principles of cell structure and function.
  4. Explain how cells and organisms reproduce, both sexually and asexually.
  5. Differentiate and compare the principles of information transfer at the cellular level, from DNA to protein, and at the population level, from one generation to the next.
  6. Describe and explain the principles of genetic inheritance and apply these to the genetics of human conditions
  7. Know and define the processes, applications, and issues involved in the field of biotechnology.
  8. Develop an understanding based in knowledge of one's own values with regard to biological issues.
  9. Explain and describe the principles of evolution and its underlying causes.
- 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. 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 9/Ethical and Civic Responsibility: The student will be able to:
1. Examine, articulate, and apply their own ethical views.
  2. Analyze and reflect on the ethical dimensions of legal, social, and scientific issues.
  3. Recognize the diversity of political motivations and interests of others.
- G. **METHODS FOR EVALUATION OF STUDENT LEARNING:** Methods may include but are not limited to:
1. Laboratory reports and/or quizzes
  2. Objective and/or subjective tests
  3. Laboratory practical tests
  4. Assignments
  5. Essay tasks
  6. Group work/projects
  7. Presentations
- 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):** None