

# BIOL 0056 - BIOLOGY: A HUMAN PERSPECTIVE

## Catalog Description

Advisory: Eligibility for ENGL 11 strongly recommended

Hours: 54 lecture

Description: Principles of biology and how they relate to humans. Emphasis on the human organism, including anatomy, physiology, medicine, research, genetics, evolution, ecology and human impacts on the environment. Not recommended for Biological Sciences majors or students who have completed BIOL 10 or BIOL 11. (CSU, UC-with unit limitation)

## Course Student Learning Outcomes

- CSLO #1: Describe the structure and function of eukaryotic cells and their cellular processes.
- CSLO #2: Compare structure and function of human body systems from chemical through system levels of organization.
- CSLO #3: Explain the process of inheritance; how the genetic code determines cell structure and function, and the role it plays in evolutionary processes.
- CSLO #4: Evaluate the past, present and future effect of human activities on ecological systems.
- CSLO #5: Evaluate the biological, ethical, and social dimensions of current advancements in biotechnology.

## Effective Term

Fall 2022

## Course Type

Credit - Nondegree-applicable

## Contact Hours

54

## Outside of Class Hours

108

## Total Student Learning Hours

162

## Course Objectives

1. apply the processes of scientific inquiry to develop hypotheses, design experiments, and critically evaluate experimental design and scientific claims;
2. diagram the human levels of organization from molecular to ecosystem level;
3. describe the structure and function of inorganic and organic molecules in living cells;
4. outline the basic structure and function of cells and cellular components;
5. discuss the permeability properties of the cell membrane and factors influencing membrane transport;

6. examine the role of photosynthesis, cellular respiration, and decomposition in nutrient recycling and energy flow in ecosystems;
7. discuss the characteristics of enzymes and evaluate the various factors that affect enzyme activity;
8. compare lactic acid fermentation and aerobic respiration in terms of initial reactants, final products, cellular locations, and amount of ATP produced;
9. outline the steps involved in DNA replication and explain how genetic information is transmitted through cell division and sexual reproduction;
10. outline the steps involved in gene expression and explain how the genetic code determines cell function via gene regulation and protein synthesis;
11. correlate how mutations and errors in the cell cycle can lead to congenital disorders or disease;
12. formulate the Mendelian rules of genetics and solve genetics problems;
13. discuss how exceptions to Mendel's rules apply to human genetics;
14. evaluate patterns of inheritance of human genetic disorders;
15. discuss the applications of genomics, proteomics, genetic engineering concepts and techniques;
16. evaluate the biological, ethical, and social dimensions of current advancements in biotechnology;
17. use anatomical terminology to describe body directions, regions, cavities, and structures;
18. categorize the four primary tissue types based on structure, function, and location in the human body;
19. describe the structure and functions of the human organ systems and the organs comprising each system;
20. apply the processes of homeostatic and feedback control mechanisms to explain how organ systems are regulated and integrated to maintain homeostasis;
21. evaluate human diseases and health issues by analyzing their causes, treatment options, and prevention;
22. discuss mechanisms leading to biological evolution by analyzing the relationship between genetics, heredity, adaptation, and the environment;
23. compare and contrast microevolution and macroevolution;
24. investigate evolutionary adaptations found in Homo sapiens;
25. assess aspects of sustainability and outline human dependence on natural resources and services;
26. evaluate past, present, and future effects of human activity and population growth on natural ecosystems.

## General Education Information

- Approved College Associate Degree GE Applicability
  - AA/AS - Life Sciences
- CSU GE Applicability (Recommended-requires CSU approval)
  - CSUGE - B2 Life Science
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
  - IGETC - 5B Biological Science

## Articulation Information

- CSU Transferable
- UC Transferable

## Methods of Evaluation

- Essay Examinations
  - Example: 1. Compare and contrast the roles of the parasympathetic and sympathetic divisions. What is the goal of each division and use examples of their effects on at least

three various organs or tissues. Students will be graded on the content and accuracy of the response. Rubric grading. Course objectives: #19. describe the structure and functions of the human organ systems and the organs comprising each system. #20. apply the processes of homeostatic and feedback control mechanisms to explain how organ systems are regulated and integrated to maintain homeostasis. 2. Describe what the biodiversity crisis is and the acronym H-I-P-P-O which stands for the factors which are contributing to this crisis. B). Give a specific example for each factor. C). Express two things you can do or not do to conserve resources and contribute to sustainability efforts. Students will be graded on the content and accuracy of response. Rubric grading. Course objectives: #25 - Assess aspects of sustainability and outline human dependence on natural resources and services; #26 - Evaluate past, present, and future effects of human activity and population growth on natural ecosystems.

- Objective Examinations
  - Example: Which of the following is a FALSE statement about enzymes? a. An enzymes function depends on its shape b. Enzymes are specific for certain substrates c. Enzymes cannot be reused d. An enzyme binds its substrate at its active site e. Enzyme function is affected by acidic environments Course Objective: #7. discuss the characteristics of enzymes and evaluate the various factors that affect enzyme activity
- Problem Solving Examinations
  - Example: What phenotypic ratio would be expected in the offspring of a rabbit heterozygous for the fur color and length (DdLl) and another heterozygous rabbit (DdLl)? Assume that D=dark fur; d=light fur; L=long fur; l=short fur. Both dominant alleles are completely dominant. Students will be graded on the accuracy of their response. Correct or incorrect. Course Objective: #12. formulate the Mendelian rules of genetics and solve genetics problems
- Reports
  - Example: Students will work in groups to research a human disease of their choice and present the topic to the class. Rubric grading will be used. Course Objective: #21. Evaluate human diseases and health issues by analyzing their causes, treatment options, and prevention

## Repeatable

No

## Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Instructor will lecture using lecture slide presentations to introduce concepts of the cardiovascular system. Students will be asked to then label the anatomical structures on a heart diagram and trace the path of blood through the heart. Students will then compare their results to other students and discuss any questions they have on the concept.

Distance Learning

1. Instructor will present a recorded video lecture on the stages of mitosis and provide additional online mitosis animations for students

to watch. Students will then illustrate mitosis by drawing and labeling the events occurring in the stages of cell division for a cell that is  $2n$

2. Students will share their illustrations with their discussion board groups. Students will evaluate and provide feedback on each other's work.

## Typical Out of Class Assignments Reading Assignments

1. Students will be assigned to read the textbook chapter on cellular respiration and then answer the review questions at the end of the chapter. 2. Students will be assigned to read the article "How Cancer Arises" and then participate in an in-class and/or online class discussion about the causes of cancer.

## Writing, Problem Solving or Performance

1. After reading the chapter Patterns of Inheritance solve the assigned genetics problem: Suppose two individuals heterozygous for freckles and a widow's peak mate. F = freckles; f = no freckles. W = widow's peak; w = straight hairline a. What is the probability that this couple has a child with neither freckles nor a widow's peak? b. What is the probability they have a child with freckles and a straight hairline? c. Show the Punnett square
2. Use the internet and library databases to search for one example of a credible scientific claim and one that would be considered pseudoscience or non-credible. In a written response, explain what makes your examples credible or not credible. What factors do you considered when evaluating these claims and what increased or decreased your confidence in the claim? Make sure to include the reference for your two examples.

## Other (Term projects, research papers, portfolios, etc.) Required Materials

- Essential Biology with Physiology
  - Author: Simon
  - Publisher: Pearson/ Prentice Hall
  - Publication Date: 2019
  - Text Edition: 6th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Human Biology
  - Author: Mader, S. and Windelspecht, M.
  - Publisher: McGraw-Hill
  - Publication Date: 2020
  - Text Edition: 16th
  - Classic Textbook?:
  - OER Link:
  - OER:

## Other materials and-or supplies required of students that contribute to the cost of the course.