

**BIOLOGY 110  
GENERAL BIOLOGY**

**BULLETIN INFORMATION**

BIOL 110 - General Biology (4 credit hours)

**Course Description:**

Basic biological concepts and issues for non-biology majors. Credit may not be given for both this course and BIOL 120.

Note: three lectures, two laboratory hours per week.

**SAMPLE COURSE OVERVIEW**

BIOL 110 is an introductory biology course for non-majors. Its purpose is to provide a basic overview of biological processes at multiple spatial and temporal scales that will generate a basis for understanding modern biological issues and their importance to contemporary societal issues. In this course the student will have the opportunity to learn how science is conducted and what distinguishes it from other methods of understanding the world around us. The student will have the opportunity to learn about three of the most important sub-disciplines within biology that impact our daily lives; *inheritance*, *evolution*, and *ecology*. BIOL 110 emphasizes the scientific inquiry as a method of understanding the natural world and focuses on the use of experimental design and technology to solve questions about biological function that influence contemporary societal issues. Historical and contemporary case studies will be used to illustrate scientific inquiry. Analytical reasoning will also be used to critically evaluate data to assess quantitative and qualitative experimental outcomes that culminate in our modern understanding of Biology. Additionally, the importance of biological scientific literacy to understand and analyze the impact of biological processes on contemporary issues such as genetic engineering and other applications of DNA technology, diagnosis and treatment of genetic and metabolic diseases, and implications of genomics to human health and welfare will be emphasized.

Lab: This lab is geared for non-science majors and complements as well as sometimes expands upon lecture work. To the extent possible, lab work will be presented in conjunction with lecture material. Typically labs will begin with a quiz on last week's material, followed by administrative comments if any, topic lecture, explanation of the lab work, doing the lab, and finally, a review of your work for correctness prior to your leaving. Labs are scheduled for 2 hours and for the most part, will take the full time to complete.

**ITEMIZED LEARNING OUTCOMES**

**Upon successful completion of Biology 110, students will be able to:**

1. Distinguish scientific inquiry from other legitimate methods of inquiry and to recognize the difference between scientifically legitimate inquiry and claims without a sound scientific basis

2. Critically evaluate the merits or failure of scientific hypotheses
3. Identify and describe the characteristics of the chemistry of elements common to all of life
4. Describe the principle of cellular organization regulating critical cellular functions, including metabolism, gene expression, photosynthesis, etc.
5. Describe the principles of cell division in the soma and germ line
6. Describe the mechanism of DNA replication
7. Assess the methods by which extensive genetic information is generated by the permutation of a simple genetic code and the manner in which this variation is translated and integrated to form the whole organism
8. Discuss how study of fundamental mechanisms such as gene replication and expression pioneered the development of modern DNA technologies and the practical applications of DNA technologies to human welfare
9. Assess ethical issues that arise through the application of DNA technology
10. Demonstrate recognition of the role of sound scientific information in policy and management issues
11. Describe the roles of evolutionary processes in generating the diversity of life
12. Apply statistical and quantitative approaches to analyze phenotypic ratios from different genetic experiments
13. Evaluate the role of genetic variation in contributing to human health welfare
14. Demonstrate the ability to infer the phenotypic composition of populations from its underlying genetic variation
15. Evaluate the evidence of evolution by common descent by interpreting patterns of biogeographic, genetic, morphological, and biochemical relationships among organisms
16. Distinguish the processes that control the assembly of species into communities and how the function of these communities contribute to human welfare
17. Assess the long-term consequences of human activities in altering ecosystem composition and services on local, regional and global scales

### **SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS**

1. Campbell, *Essential Biology*
2. *Mastering Biology*- Student access code card. Course ID: MBBATES 20428

### **SAMPLE ASSIGNMENTS AND/OR EXAM**

#### **1. 4 Exams**

- a. Each exam is of equal weight; the lowest exam score will be dropped. The fourth exam will be given during the scheduled final examination period and is not a cumulative exam.
- b. Exams will include questions that will evaluate student comprehension of the key aspects of inheritance, evolution, and ecology. The exams will test if the students have a good understanding of the scientific inquiry as a method to solve questions about biological function that influence contemporary societal issues. Student understanding of the historical and contemporary case studies to illustrate scientific inquiry used in the lectures will also be tested. Analytical

reasoning needed to critically evaluate data to assess quantitative and qualitative experimental outcomes will be assessed via questions. Most importantly, student learning about the impact of genetic engineering and recombinant DNA technology on diagnosis and treatment of genetic and metabolic diseases, and implications of genomics to human health and welfare will be assessed via the four exams.

2. **Online homework on the *Mastering Biology* website**
3. **Lab quizzes**
4. **Lab Exam #1 (Genetics)**
5. **Lab Exam #2 (Animals)**
6. **Lab ecology presentation**
7. **Lab attendance and participation**
8. **Lab quizzes, exams, and presentation:** The lab quizzes, exams, and presentation will be structured to evaluate the understanding about scientific method and conclusions based on sound scientific evidence gathered from well-designed and controlled scientific experiments. Student understanding of the main principles of inheritance, evolution, and ecology will be evaluated through quizzes and presentations.

#### **SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS**

<b>Week 1:</b>	Introduction Chapter 1 Importance of Biology Today
<b>Week 2:</b>	Chapter 2 Chemistry for Biology Chapter 3 The Molecules of Life
<b>Week 3:</b>	Chapter 4 The Cell Lab: Scientific Inquiry
<b>Week 4:</b>	Chapter 5 The Working Cell: Enzymes and ATP Review for Exam Lab: Microscope
<b>Week 5:</b>	EXAM 1 Chapter 10 DNA & RNA Lab: Macromolecules
<b>Week 6:</b>	Chapter 10 DNA & RNA Chapter 8 Cellular Reproduction Lab: Enzymes
<b>Week 7:</b>	Chapter 8 Cellular Reproduction

	Chapter 9	Inheritance Lab: Genetics
<b>Week 8:</b>	Chapter 9 Chapter 9	Inheritance Inheritance/Review Lab: Genetics
<b>Week 9:</b>	EXAM 2 Chapter 11	Gene Regulation
<b>Week 10:</b>	Chapter 12 Chapter 12	Gene Regulation/DNA Technology DNA Technology Lab: Genetics Exam
<b>Week 11:</b>	Chapter 13 Chapter 14	Darwin- How Populations Evolve Introduction to Biological Diversity Animals Lab: dissecting (with a partner) a starfish, crawfish, and a frog
<b>Week 12:</b>	EXAM 3 Chapter 17	Human Ecology Animals Lab: dissecting (with a partner) a starfish, crawfish, and a frog
<b>Week 13:</b>	Chapter 18 Chapter 19	Ecology and the Biosphere Population Ecology Lab: Animals Exam
<b>Week 14:</b>	Chapter 19 Chapter 20	Population Ecology Community Ecology Lab: Ecology Presentations
<b>Week 15:</b>	Chapter 20	Community Ecology Lab: Ecology Presentations

**Final Exam according to University exam schedule**