BIOL 110
Biology I: Molecules and Cells
4 Credits

Community College of Baltimore County
Common Course Outline

Description

BIOL 110 – Biology I: Molecules and Cells: serves as a foundational course for biological science and allied health majors. This course provides a comprehensive introduction to the fundamental principles of biology. Topics include the scientific method, molecular biology, genetics, cell structure, function and energetics. Emphasis is placed on understanding biological processes and their relevance to everyday life. Students will explore how living organisms interact with each other and their environments, and how biological knowledge informs issues such as health, sustainability, and biotechnology. The course includes lectures and laboratory exercises designed to develop scientific thinking and analytical skills. The laboratory introduces the student to various biological techniques and emphasizes the process of science. This course is intended for students majoring in biology and allied health and serves as a foundation for further study in the life sciences.

Pre-requisites: ESOL 052 and ESOL 100
Co-requisites: ACLT 053 and MATH 083

Overall Course Objectives

Upon completion of this course, students will be able to:

1. Apply scientific principles to interpret and communicate information accurately and effectively;
2. Apply correct experimental designs to simulated problem-solving situations to eliminate potential bias;
3. Perform basic measurements and calculations using the metric system;
4. Demonstrate the appropriate use of laboratory equipment to gather and analyze data;
5. Organize data into tables or graphs to draw inferences from the data;
6. Demonstrate the proper use of a light microscope;
7. Explain how complex cell functions are governed by chemical principles that apply to all matter;
8. Explain how a cell is the basic unit of life including the function of organelles;
9. Explain the principles of bioenergetics, including the processes of photosynthesis, aerobic and anaerobic respiration, and fermentation;
10. Describe how living organisms store and process genetic information to control their life functions and activities;
11. Compare and contrast asexual and sexual reproduction;
12. Solve genetic problems involving simple Mendelian traits, incomplete dominance, co-dominance and sex-linked traits;

13. Apply genetic principles to explain patterns of inheritance, prevalence of genetic disorders and genetic diversity in human populations;
14. Determine the relevance and ethical use of biotechnological advances as they relate to human life and;
15. Find, evaluate, use, and cite valid sources in scientific reasoning and/or inquiry.

Major Topics

I. Chemistry of life
II. Characteristics and classification of life
III. Cells
    a. Types
    b. Structures
    c. Function
    d. Microscopy
IV. Cell membrane structure and function
V. Cellular metabolism
    a. Enzymes
    b. Photosynthesis
    c. Cellular respiration
VI. Cellular reproduction
    a. DNA structure and replication
    b. Mitosis
    c. Meiosis
VII. Molecular genetics
    a. Transcription
    b. Translation
VIII. Classical genetics
IX. Evolution
X. Biotechnology
XI. The process of science
    a. Metric system of measurement
    b. Lab skills including proper use of scientific equipment

Course Requirements

Students must obtain 60% score in both lecture and lab separately to pass this course. Failure in either the lecture or the lab will result in failure of the course overall.
No more than 30% of a student's total grade may come from homework, non-proctored work, or open book tests.
Lab schedules are to be determined by the campus course coordinator. Instructors must complete all the scheduled labs.
Lecture grades will count for 70-80% of the total course grade, and the remaining 20-30% will come from lab.
Grading will be determined by the individual faculty member, but shall include the following, at minimum:

Lecture Portion:

- three Unit Exams, each exam worth 10-20% of the total course grade.
- a comprehensive Final Exam worth 10-25% of the total course grade.

Lab Portion:

- two lab practical exams
- a formal project which includes a scientific poster presentation worth a minimum of 20% of the laboratory grade. This assignment will allow students to demonstrate the General Education Program Outcomes
- short lab reports, lab quizzes, or a lab notebook will comprise the remainder of the lab grade

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 4-credit General Education course in the Biological and Physical Sciences category that fulfills the laboratory requirement. Please refer to the current CCBC Catalog for General Education course criteria and outcomes.

Date Revised: 2/3/2026