

Common Course Outline

BIOL 120

Introduction to Biotechnology

4 semester hours

The Community College of Baltimore County

Description

Introduction to Biotechnology explores the basic biological and chemical concepts behind biotechnology as well as applications to medicine, agriculture, forensic sciences and environmental sciences. Students are provided lecture, laboratory, and a series of guest lectures with leaders of local biotechnology firms. Discussion sections highlight future applications as well as the ethical dimensions of this technology. This course is for those students exploring biotechnology as a possible career option, as well as students interested in the societal impacts of this emerging technology.

Prerequisites: ENGL 052, RDNG 052, MATH 082

Overall Course Objectives

Upon completion of this course students will be able to:

1. Differentiate the different classes of macromolecules important in biological systems and describe their properties;
2. Describe the basic forms of chemical bonding and their properties;
3. Use the periodic table to determine the formula weight of a given chemical compound;
4. Demonstrate an understanding of basic laboratory math by properly balancing chemical equations and preparing laboratory solutions;
5. Describe the major functional groups of organic molecules;
6. Describe the fundamental cellular components of prokaryotic and eukaryotic cells and their function;
7. Be able to differentiate between eukaryotic and prokaryotic cells;
8. Describe basic metabolic processes;
9. Describe tools used in the biotechnology laboratory including:
 - a. Enzymes

- b. Nucleic acids
 - c. Antibodies
 - d. Physical separation methods including:
 - i. Centrifugation
 - ii. Electrophoresis
 - iii. Chromatography
10. Identify career opportunities in biotechnology, and
11. Discuss the effect that discoveries in biotechnology are having on health care, agriculture, forensic sciences, and environmental sciences.

Major Topics

- I. Development of Biotechnology
- II. Chemistry for Biotechnology
 - a. Inorganic Chemistry
 - b. Organic Chemistry
 - c. Biochemistry
- III. Biology for Biotechnology
 - a. The cell
 - b. Enzymes and chemical reactions
 - c. Metabolism
 - d. How information is encoded and expressed
 - e. The immune system
- IV. Math for Biotechnology
 - a. Basic math techniques
 - b. Proportional relationships
- V. The Biotechnology Workplace
 - a. Research activities
 - b. Pharmaceutical Development
 - c. Diagnostics
 - d. Manufacturing
- VI. Societal Impacts of Biotechnology
 - a. Health Care
 - b. Agriculture
 - c. Criminal Justice
 - d. Environmental Sciences

Course Requirements

Grading procedures will be determined by the individual faculty member but will include the following minimums: 3 examinations, weekly reading assignments and 1 writing assignment. Specific reading and writing assignments for this course will be determined by the individual faculty member(s).

Other Course Information

This course is a requirement for the biotechnology program. This course may be waived at the program directors discretion for those students with additional preparation in biology and/or chemistry.

The Community College of Baltimore County is committed to providing a high-quality learning experience that results in growth in knowledge, attitudes, and skills necessary to function successfully as a transfer student, in a career and as a citizen. To accomplish this goal, we maintain high academic standards and expect students to accept responsibility for their individual growth by attending classes, completing all homework and other assignments, participating in class activities and preparing for tests.

We take seriously our responsibility to maintain high-quality programs and will periodically ask you to participate in assessment activities to determine whether our students are attaining the knowledge, attitudes, and skills appropriate to various courses and programs. The assessment activities may take many different forms such as surveys, standardized or faculty-developed tests, discussion groups or portfolio evaluations. We ask that you take these activities seriously so that we can obtain valid data to use for the continuous improvement of CCBC's courses and programs.

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.

Date Revised: 10/08/02