# BIOLOGY

## Natural and Applied Sciences Division

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## Program Description:

Biology is the study of living organisms. Through the use of the scientific method, biologists seek to understand the unity and diversity of life. By understanding biological processes, we can make intelligent decisions regarding our environment, our health and our place in the ecosystem.

A solid background in the life sciences is required for many careers, including work in the allied health professions, agriculture, food service, parks and recreation, and education. Occupations with a scientific and technological component will be increasingly available in the future.

High School Preparation: Chemistry, physics, and four years of college preparatory mathematics; a foreign language is recommended. A biology major transfers to a four-year institution to complete a bachelor's degree. Cabrillo's Biology program is articulated with the UC and CSU systems and includes the standard courses needed to complete the first two years of the major.

Verification of prerequisites will be required. Prerequisites for courses in this department are computer enforced. Students should be sure records have been entered into the Cabrillo computer system before attempting to enroll.

### Model Program for Biology

The following Model Program fulfills requirements for the A.S./A.A. Degree in Biology at Cabrillo College. Specific lower division major preparation at four-year public institutions in California can be found at www.assist.org. Please see a counselor for advisement for transfer to any four-year institution.

## A.A. Degree: Biology

| **A.A. General Education** | | **30 Units** |
|---|---|---|
| **Biology Core** | | |
| BIO 1A | Cell and Molecular Biology | 5 |
| BIO 1B | Animal Diversity and Evolutionary Principles | 5 |
| BIO 1C | Plant Biology and Ecological Principles | 5 |
| **Related Disciplines (Choose 15 units)** | | |
| CHEM 1A | General Chemistry I | 5 |
| CHEM 1B | General Chemistry II | 5 |
| CHEM 12A | Organic Chemistry I | 3 |
| and | | |
| CHEM 12AL | Organic Chemistry Laboratory I | 2 |
| CHEM 12B | Organic Chemistry II | 3 |
| and | | |
| CHEM 12BL | Organic Chemistry Laboratory II | 2 |
| Foreign Language * | | 0-12 |
| MATH 5A | Analytic Geometry and Calculus I | 5 |
| MATH 5B | Analytic Geometry and Calculus II | 5 |
| MATH 5C | Analytic Geometry and Calculus III | 5 |
| PHYS 2A | General Physics | 4 |
| PHYS 2B | General Physics | 4 |
| or | | |
| PHYS 4A | Physics for Scientists and Engineers | 5 |
| PHYS 4B | **Physics for Scientists and Engineers | 5 |
| PHYS 4C | ***Physics for Scientists and Engineers | 5 |
| **Total Units** | | **60** |

**The student should consult the catalog of the intended transfer institution concerning the necessity or appropriateness of these courses.**fall only; ***spring only*

## A.S. Degree: Biology

| **A.S. General Education** | | **21 Units** |
|---|---|---|
| Biology Core | | |
| BIO 1A | Cell and Molecular Biology | 5 |
| BIO 1B | Animal Diversity and Evolutionary Principles | 5 |
| BIO 1C | Plant Biology and Ecological Principles | 5 |
| **Related Disciplines (Choose 24 units)** | | |
| CHEM 1A | General Chemistry I | 5 |
| CHEM 1B | General Chemistry II | 5 |
| CHEM 12A | Organic Chemistry I | 3 |
| and | | |
| CHEM 12AL | Organic Chemistry Laboratory I | 2 |
| CHEM 12B | Organic Chemistry II | 3 |
| and | | |
| CHEM 12BL | Organic Chemistry Laboratory II | 2 |
| Foreign Language * | | 0-12 |
| MATH 5A | Analytic Geometry and Calculus I | 5 |
| MATH 5B | Analytic Geometry and Calculus II | 5 |
| MATH 5C | Analytic Geometry and Calculus III | 5 |
| PHYS 2A | General Physics | 4 |
| PHYS 2B | General Physics | 4 |
| or | | |
| PHYS 4A | Physics for Scientists and Engineers | 5 |
| PHYS 4B | **Physics for Scientists and Engineers | 5 |
| PHYS 4C | ***Physics for Scientists and Engineers | 5 |
| **Total Units** | | **60** |

**The student should consult the catalog of the intended transfer institution concerning the necessity or appropriateness of these courses.**fall only; ***spring only*

# Biology Courses

## BIO 1A
## Cell and Molecular Biology

5 units; 3 hours Lecture, 6 hours Laboratory

Prerequisite: CHEM 1A.

Hybrid Requisite: Completion of or concurrent enrollment in BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Examines in-depth the molecular mechanisms of cell function. Students learn how molecules interact to give cells the ability to use energy, reproduce, grow, and develop. Topics include cell structure and function, cell signaling, DNA structure and function, cell division, genetics, biotechnology, gene expression, development, and human diseases. Introduces students to interpreting and critiquing primary research articles. Laboratories focus on the use of biotechnologies in solving research questions and diseases.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 1B
## Animal Diversity and Evolutionary Principles

5 units; 3 hours Lecture, 6 hours Laboratory

Prerequisite: MATH 152.

Corequisite: Completion of or concurrent enrollment in BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Introduces principles of evolutionary biology, and examines their application in a survey of important animal clades. The course also explores in-depth diversity in animal form and function, and considers how evolutionary history, selection, and other factors produce different solutions to problems that many animals have in common. Labs introduce students to techniques used to study evolutionary problems, and give them experience with a diversity of animal groups.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 1C
## Plant Biology and Ecological Principles

5 units; 3 hours Lecture, 6 hours Laboratory

Prerequisite: MATH 152.

Hybrid Requisite: Completion of or concurrent enrollment in BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents an in-depth exploration of diversity in photosynthetic protist, plant and fungal form and function, and introduces students to principles of ecology. Themes include how evolutionary history, selection, ecology, and other factors produce different solutions to 'problems' that many plants have to face. Lectures provide the informational and thematic framework for the course. Laboratories introduce the diversity of photosynthetic protists, plants, and fungi, plant biology, and techniques used to study ecological problems.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 4
## Human Anatomy

4 units; 3 hours Lecture, 3 hours Laboratory

Hybrid Requisite: Completion of or concurrent enrollment in BIO 201

Recommended Preparation: MA 70 and MA 170B; Eligibility for ENGL 100 and READ 100.

Presents the gross structure of the organ systems of the human body through lecture, demonstrations, and dissection. This course is planned for allied health students.

*Transfer Credit:* Transfers to CSU, UC, with limits: BIO 4 combined with BIO 5 and 13A + 13AL-maximum credit 2 courses.

## BIO 4A
## Human Anatomy Coordinated Studies

1 unit; 3 hours Directed Study

Corequisite: BIO 4.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Provides an enrichment program in anatomy, to be taken concurrently with BIO 4. This course is tailored to individual needs and interests as enrichment or an expansion of subject area material through laboratory or directed reading.

*Transfer Credit:* Transfers to CSU.

## BIO 5
## Human Physiology

4 units; 3 hours Lecture, 3 hours Laboratory

Prerequisite: CHEM 2 taken at college or CHEM 30A or CHEM 32.

Recommended Preparation: BIO 4; Eligibility for ENGL 100 and READ 100.

Presents an exploration of the functions of the various physiological systems and their underlying chemical basis. Functions of cells, tissues, organs and systems are examined with respect to the human organism through lecture and laboratory. Designed for allied health students.

*Transfer Credit:* Transfers to CSU, UC, with limits: BIO 5 combined with BIO 4 and 13A + 13AL- maximum credit-2 courses

## BIO 6
## Microbiology

4 units; 3 hours Lecture, 3 hours Laboratory

Prerequisite: CHEM 2 taken at college or CHEM 30A or CHEM 32.

Hybrid Requisite: Completion of or concurrent enrollment in BIO 201.

Recommended Preparation: BIO 4; Eligibility for ENGL 100 and READ 100.

Presents a survey covering cell structure metabolism, molecular genetics and growth, control, and the role of microorganisms in infectious diseases. Emphasis is on bacterial organisms, but includes eukaryotic microbes and viruses as well.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 10
## Plants and Society

3 units; 3 hours Lecture

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Explores the importance of plants to human history, culture and contemporary societies, and the ecological relationships between plants, humans and the environment. Emphasizes the ways in which plants have influenced human, social, cultural and economic development.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 11A
## General Biology

4 units; 3 hours Lecture, 3 hours Laboratory

Hybrid Requisite: Completion of concurrent enrollment in BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents an introduction to the world of living things. Topics include molecular and cell biology, genetics, biotechnology, human biology, diversity of life, evolution, and ecology. Emphasis is on current biological issues. Recommended for non-biology majors or prospective biology majors who lack previous high school biology course work.

*Transfer Credit:* Transfers to CSU; UC, with conditions: No credit if taken after BIO 1A, 1B or 1C.

## BIO 11B
## Marine Biology

4 units; 3 hours Lecture, 3 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Explore the local ocean habitats and marine organisms of the Monterey Bay National Marine Sanctuary. Emphasis will be on ecological relationships, adaptations of organisms to their environments, and marine conservation efforts. Several field trips will take place during the lab sessions.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 11C
## Ecology

5 units; 3 hours Lecture, 6 hours Laboratory

Hybrid Requisite: Completion of or concurrent enrollment in BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Covers factors influencing distribution, abundance, and evolution of organisms. Includes simulations, experiments, individual projects and field trips. For Biology and Environmental Studies majors.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 13A
## Biology of People-Anatomy and Physiology

3 units; 3 hours Lecture

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents a survey of the integration of structure and function of the most wonderful of machines, the human body. The healthy state is emphasized but selected disease processes are covered. Intended for nonscience majors or selected pre-health professionals. Not open to students who have taken BIO 4 or BIO 5. Portions of this course may be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU, UC, with limits: BIO 13A + 13AL combined with BIO 4 and 5- maximum credit- 2 courses.

## BIO 13AL
## Biology of People-Anatomy & Physiology Lab

1 unit; 3 hours Laboratory

Hybrid Requisite: Completion of or concurrent enrollment in BIO 13A and BIO 201.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents a human anatomy and physiology laboratory course designed to accompany BIO 13A. Course involves hands-on experiences to assist in understanding the various structures and functions of the body. Includes use of models, experimentation, demonstrations, and limited dissection.

*Transfer Credit:* Transfers to CSU, UC, with limits: BIO 13A + 13AL combined with BIO 4 and 5-maximum credit-2 courses.

## BIO 13B
## Biology of People-Human Genetics

3 units; 3 hours Lecture

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Introduction to basic principles of inheritance and how they apply to humans. Includes Mendelian genetics, molecular genetics, medical genetics, genetics of cancer and immunity, reproductive technology, human diversity and evolution, behavioral genetics, and bioethics.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 15A-Z
## Natural History of Western America

2 - 7 units; 1 hour Lecture, 3 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Repeatability: May be taken a total of 4 times.

Involves extensive field experiences including biology of deserts, mountains, islands, or tropical forests. Learning will be based upon readings, lectures, group and individual research projects. Focus will be how ecological, behavioral and evolution theory is reflected in patterns seen in these communities, along with identification methods for native plants and animals. Students must be prepared for a primitive camping experience and long hours of intensive learning.

*Transfer Credit:* Transfers to CSU.

## BIO 17A-Z
## Special Topics in Biology

2 - 3 units; 2 hours Lecture or 6 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Presents topics in specialized fields of biology with an emphasis on recent advances and the use of a multidisciplinary approach. Some fields include biotechnology, human biology, ecology, evolution, and organismal biology. Course content may vary with each offering.

*Transfer Credit:* Transfers to CSU; UC, with conditions: Students must retain a copy of the course outline, the course syllabus and work completed for this course. Credit for this course is contingent upon a review of the course outline and other materials by the UC transfer campus.

## BIO 21
## Field Biology

4 units; 3 hours Lecture, 3 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Introduces natural history classification, distribution, ecology, and evolution of common plants and animals, emphasizing biological field methods in the study of biotic populations.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 31
## Animal Behavior

3 units; 3 hours Lecture

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Explores animal behavior including the hardships of growing up, capturing food, escaping, migrating, navigating, communicating, making homes, competing for mates, courting, sex, and taking care of offspring, and complex social behaviors.

*Transfer Credit:* Transfers to CSU, UC.

## BIO 201
## Introduction to the Microscope

0.25 - 0.5 units; 0.25 hour Lecture

Introduces proper use and handling of light compound and dissection microscopes. Other topics include the history and principles of microscopy and preparation of biological specimens for microscopy.