BIOLOGY

Natural and Applied Sciences Division

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Biology A.S.-T Degree

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 in Biology, Biological Sciences, or Biochemistry, with a choice of concentrations from Biotechnology to Zoology. 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.

Cabrillo offers options for degrees in Biology. The first option listed below is an Associate in Science in Biology for Transfer (A.S.-T), which is intended for students who plan to complete a bachelor's degree in a similar major at a CSU campus. Students completing these degrees are guaranteed admission to the CSU system, but not to a particular campus or major. See Associate Degree for Transfer information in the Cabrillo College Catalog. IGETC for STEM (for CSU) is required for the Biology A.S.-T degree. The following is required for all A.A.-T or A.S.-T degrees:

- Completion of 60 CSU-transferable semester units.
- Minimum grade-point average (GPA) of at least 2.0 in all CSU-transferable coursework. While a minimum of 2.0 is required for admission, some majors may require a higher GPA.
- Completion of a minimum of 18 semester units in the major with a letter grade of "C" or better, or a "P" if the course is taken on a "pass/no pass" basis.
- Certified completion of the California State University General Education- Breadth pattern (CSU GE Breadth) or the Intersegmental General Education Transfer Curriculum (IGETC) pattern.

Learning Outcomes

The Cabrillo College Core Competencies (with an emphasis in the study of Biology):

1. Communication: Reading, Writing, Listening, Speaking and/or Conversing
2. Critical Thinking and Information Competency: Analysis, Computation, Research, Problem Solving
3. Global Awareness: An appreciation of Scientific Processes, Global Systems and Civics, and Artistic Variety
4. Personal Responsibility and Professional Development: Self-Management and Self-Awareness, Social and Physical Wellness, Workplace Skills

IGETC for STEM for CSU

General Education Requirements		**31-33 Units**
Core Courses		**Units**
BIO 9A	Molecular, Cellular, and Animal Biology.	5
BIO 9B	Ecology, Evolution, and Plant Biology	5
CHEM 1A	General Chemistry I	5
CHEM 1B	General Chemistry II	5
MATH 5A	Analytic Geometry and Calculus I	5
PHYS 2A	**General Physics I	4
and		
PHYS 2B	***General Physics II	4
or		
PHYS 4A	Physics for Scientists and Engineers I	5
and		
PHYS 4B	**Physics for Scientists and Engineers II	5

All core courses are also general education courses.
*Students who previously completed the CABRILLO BIO 1ABC series may substitute that series for BIO 9AB for this degree.

List B - Courses that may be required by the transfer institution, but are not required for the degree.		**Units**
BIO 6	Microbiology	4
CHEM 12A	Organic Chemistry I	3
CHEM 12AL	Organic Chemistry Laboratory I	2
CHEM 12B	Organic Chemistry II	3
CHEM 12BL	Organic Chemistry Laboratory II	2
MATH 5B	Analytic Geometry and Calculus II	5
MATH 12	Elementary Statistics	5
MATH 12H	Honors Elementary Statistics	5
PSYCH 1	General Psychology	3
PSYCH 1H	Honors General Psychology	3
PSYCH 4	Introduction to Biological Psychology	3
Total Units		**60**

Biology A.S. Degree

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Model Program for Biology

These Associate Degrees require 60 units appropriate to your educational goal, to include general education and at least 30 units in a

major. Courses should be selected to meet the lower-division major preparation requirements at your intended transfer university - these specific requirements can be found at www. assist. org for 4-year public institutions in California. Please see a counselor for advisement to ensure you are taking the best possible courses given your goal.

The department presents the following suggested Model Programs for this major. The courses listed below may or may not be appropriate depending on your specific goal. Please see a counselor for advisement for transfer to any 4-year institution.

A.S. General Education Biology Core		**21 Units**
BIO 9A	Molecular, Cellular, and Animal Biology.	5
BIO 9B	Ecology, Evolution, and Plant Biology.	5
Related Disciplines (Choose 29 units)		**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
or		
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 I	4
PHYS 2B	***General Physics II	4
or		
PHYS 4A	Physics for Scientists and Engineers I	5
PHYS 4B	**Physics for Scientists and Engineers II	5
PHYS 4C	***Physics for Scientists and Engineers III	5
Total Units		**60**

**fall only; ***spring only

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

Biology Courses

BIO 4 Human Anatomy

4 units; 3 hours Lecture, 3 hours Laboratory
Hybrid Requisite: Completion of or concurrent enrollment in BIO 101.
Recommended Preparation: MA 70 and MA 170B; Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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. C-ID: BIOL 110B

BIO 4A Human Anatomy Coordinated Studies

1 unit; 3 hours Laboratory
Co-requisite: BIO 4.
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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 3 and CHEM 3L taken at college (CHEM 3 + CHEM 3L formerly identified as CHEM 2) or CHEM 30A or CHEM 32.
Recommended Preparation: BIO 4; Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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. C-ID: BIOL 120B

BIO 6 Microbiology

4 units; 3 hours Lecture, 3 hours Laboratory
Prerequisite: CHEM 3 and CHEM 3L taken at college (CHEM 3 + CHEM 3L formerly identified as CHEM 2) or CHEM 30A or CHEM 32.
Hybrid Requisite: Completion of or concurrent enrollment in BIO 101.
Recommended Preparation: BIO 4; Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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 9A Molecular, Cellular, and Animal Biology

5 units; 3 hours Lecture, 6 hours Laboratory
Prerequisite: CHEM 1A.
Hybrid Requisite: Completion of or concurrent enrollment in BIO 101.
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
Examines the principles and applications of molecular biology, cell biology, and animal biology. Topics include prokaryotic and eukaryotic cell structure and function, biological molecules, homeostasis, cell reproduction, genetics, metabolism, cellular communication, animal diversity, animal anatomy, and animal physiology. The philosophy of science, methods of scientific inquiry and experimental design are foundational. Students enrolled in the Honors Transfer Program may count this course toward the Honors Scholar designation with an Honors Contract.
Transfer Credit: Transfers to CSU; UC. C-ID: BIO 9A + BIO 9B = C-ID: BIOL 135S

BIO 9B Ecology, Evolution, and Plant Biology

5 units; 3 hours Lecture, 6 hours Laboratory
Prerequisite: BIO 9A and MATH 152.
Hybrid Requisite: Completion of or concurrent enrollment in BIO 101.
Recommended Preparation: AP/Honors high school biology with a grade of "B" or better; Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
Examines ecological and evolutionary processes, and the biology of plants and fungi. Topics include plant and fungal structure, function, and diversity; community, population, and ecosystem ecology; ecosystem diversity; evolutionary mechanisms, population genetics, speciation and extinction. Students enrolled in the Honors Transfer Program may count this course toward the Honors Scholar designation with an Honors Contract.
Transfer Credit: Transfers to CSU; UC. C-ID: BIO 9A + BIO 9B = C-ID: BIOL 135S

BIO 11A General Biology

4 units; 3 hours Lecture, 3 hours Laboratory
Recommended Preparation: BIO 101; Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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 limits: No credit if taken after BIO 1A, 1B, 1C, 9A or 9B.

BIO 11B Marine Biology

4 units; 3 hours Lecture, 3 hours Laboratory
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
Explores ocean processes, habitats and organisms, including those 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 101.
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100; Eligibility for MATH 154.
Repeatability: May be taken a total of 1 time.
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 or ESL 100 and READ 100 .
Repeatability: May be taken a total of 1 time.
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 101.
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.
Repeatability: May be taken a total of 1 time.
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 31 Animal Behavior

3 units; 3 hours Lecture
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100; Eligibility for MATH 154.
Repeatability: May be taken a total of 1 time.
Explores basic principles of genetics, evolution, ecology, and the scientific method as illustrated in the study of animal behavior. Includes the challenges of growing up, catching food, avoiding predators, migrating, navigating, communicating, making homes, competing for mates, courting, sex, taking care of offspring, and complex social behaviors.
Transfer Credit: Transfers to CSU; UC, with conditions: No credit if taken after BIO 1B, 9A or 9B.

BIO 101 Introduction to Microscopy

0.25 units; 0.25 hour lecture, 0.25 hour laboratory
Repeatability: May be taken a total of 1 time.
Introduces proper use and handling of light compound and dissection microscopes. Other topics include the history and principles of microscopy, and preparation and observation of biological specimens for microscopy.
Transfer Credit: Non-transferable.