

The **AS degree in Biology** will be awarded upon satisfactory completion of the major course requirements listed below and the General Education requirements for the Associate in Science Degree listed in the Degrees and Programs section of this Catalog.

### Career Opportunities

Why Study Biology? Biologists take very diverse career paths. Some enter health fields like medicine, dentistry, nursing, physical therapy, and pharmacy. Others enter into research in environmental and conservation areas. Training in biology can also lead to careers in biotechnology and other fields of technology. Because we ourselves are life forms, interacting with and dependent on other life forms, it is important for any educated person to have an understanding of the basics of biology. This is why we invite and encourage all students to take at least one of our courses.

### Program Learning Outcomes

*Upon completion of this program a student will be able to:*

- Students demonstrate skills necessary to operate equipment used in biological disciplines, such as compound and dissecting microscopes, analytical balances, sphygmomanometers, and spectrosopes.
- Students understand and discuss different life forms based on their general knowledge of biological diversity and taxonomic relationships.
- Students apply an understanding of the scientific method to critical analyses of scientific and nonscientific explanations and hypotheses.
- Students are able to differentiate scientific hypotheses, derived through the scientific method, from explanations generated through nonscientific methods.
- Students are able to explain verbally or in writing, differences between 2 domains and differences between the different subgroups within the prokaryotes eukaryotes.

### Degree Major Requirements

DEPT/NO.	TITLE	UNITS
BIOL 1A	General Biology	5
BIOL 1B	General Biology	5
CHEM 1A	General Chemistry	5
CHEM 1B	General Chemistry	5
PHYS 4A	General Physics w/ Calculus	5
PHYS 4B	General Physics w/ Calculus	5

**Total Required Units: 30**

**Recommended Course Sequence — Option 1**

	COURSE	UNITS	REQUIREMENT	COA GE AREA
<b>FALL 1</b>	CHEM 30A Introductory General Chemistry	4	Prereq for Chem 1A	1
	MATH 1 Pre-Calculus (+215 Support Course)	4 or 6	Prereq for Chem 3A	4B
	MATH 50 Trigonometry (+216 Support Course)	3 or 4	Prereq for Chem 3A	4B
	ENGL 1A Composition and Reading <b>or</b> ENGL 1AS Composition and Reading (w/ support)	4 or 5	GE	4A
	BIOL 31 Nutrition <sup>1</sup>	34	GE	4C
<b>Total Number of Units:</b>		<b>19-23</b>		
<b>SPRING 1</b>	CHEM 1A General Chemistry	5	Major	1
	MATH 3A Calculus I	5	Prereq for PHYS 4A	4B
	MUSIC 15A Jazz, Blues and Popular Music in the American Culture <b>or</b> MUSIC 15B Jazz, Blues and Popular Music in the American Culture	3	GE	3 & 5
	PSYCH 1A Introduction to General Psychology <sup>1</sup> <b>or</b> SOC 1 Introduction to Sociology <sup>1</sup>	3	GE	2
	<b>Total Number of Units:</b>		<b>16</b>	
<b>SUMMER 1</b>	CHEM 1B General Chemistry <sup>2</sup>	5	Major	1
<b>Total Number of Units:</b>		<b>5</b>		
<b>FALL 2</b>	BIOL 1A General Biology	5	Major	1
	PHYS 4A General Physics w/ Calculus	5	Major	1
	MATH 3B Calculus II	5	Coreq for PHYS 4A	4B
	COMM 1A Introduction to Speech <sup>1</sup>	3	GE	4D
<b>Total Number of Units:</b>		<b>18</b>		
<b>SPRING 2</b>	BIOL 1B General Biology	5	Major	1
	PHYS 4B General Physics w/Calculus	5	Major	1
	MATH 3C Calculus III	5	Coreq for PHYS 4B	4B
<b>Total Number of Units:</b>		<b>15</b>		

<sup>1</sup> Course may be taken during intersession if offered.

<sup>2</sup> Students may have to take this course at another PCCD college if not offered at COA.

**Please meet with a counselor to develop a personalized education plan to help you meet your specific goals.**

**Recommended Course Sequence — Option 2**

	COURSE		UNITS	REQUIREMENT	COA GE AREA
<b>FALL 1</b>	CHEM 1A	General Chemistry	5	Major	1
	MATH 3A	Calculus I	5	Prereq for PHYS 4A	4B
	ENGL 1A ENGL 1AS	Composition and Reading <b>or</b> Composition and Reading (w/ support)	4 or 5	GE	4A
<b>Total Number of Units:</b>			<b>14-15</b>		
<b>SPRING 1</b>	CHEM 1B	General Chemistry	5	Major	1
	MATH 3B	Calculus II	5	Coreq for PHYS 4A	4B
	PHYS 4A	General Physics w/ Calculus	5	Major	1
<b>Total Number of Units:</b>			<b>15</b>		
<b>SUMMER 1</b>	COMM 1A	Introduction to Speech <sup>1</sup>	3	GE	4D
	MUSIC 15A	Jazz, Blues and Popular Music in the American Culture <sup>1</sup>	3	GE	3 & 5
<b>Total Number of Units:</b>			<b>6</b>		
<b>FALL 2</b>	BIOL 1A	General Biology	5	Major	1
	MATH 3C	Calculus III	5	Coreq for PHYS 4B	4B
	PHYS 4B	General Physics w/Calculus	5	Major	1
<b>Total Number of Units:</b>			<b>15</b>		
<b>SPRING 2</b>	BIOL 1B	General Biology	5	Major	1
	BIOL 31	Nutrition	4	GE	4C
	PSYCH 1A SOC 1	Introduction to General Psychology <b>or</b> Introduction to Sociology	3	GE	2
<b>Total Number of Units:</b>			<b>12</b>		

<sup>1</sup> Course can be taken online if offered.

Please meet with a counselor to develop a personalized education plan to help you meet your specific goals.

## Biology (BIOL)

**What is Biology?** Biologists study life from a scientific perspective. We are fascinated by the myriad ways that living organisms survive and cooperate with each other, and study how these ways came into being. **The Biology Department at College of Alameda** offers courses that consider the smallest biological molecules, whole organisms, and the entire ecosystem of the Earth. All the courses in biology help you to have a clear understanding of the scientific processes -- both philosophical and technical -- used to gather this knowledge.

### **What is special about Biology at College of Alameda?**

When you take our classes you will be taking courses that transfer to UC and CSU campuses and to private colleges and universities. Most of our classes have laboratory sections where you get hands-on experience with life forms, and personalized interaction with your instructors. Our classes are small in size with a low ratio of students to instructor. We believe this makes for the best training of a biologist. You will become actively involved in your own education. Finally, we offer classes all day, every day, including the weekends, and many nights during the week.

### **BIOL 1A**

#### **General Biology**

- 5 units, 3 hours lecture, 6 hours laboratory (GR or P/NP)
- Prerequisite: CHEM 1A
- Acceptable for credit: CSU, UC

Introduction to general biology: Cell structure and function, metabolism, molecular and organismal genetics, and animal physiology. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

### **BIOL 1B**

#### **General Biology**

- 5 units, 3 hours lecture, 6 hours laboratory (GR or P/NP)
- Prerequisite: BIOL 1A
- Acceptable for credit: CSU, UC

Continuation of BIOL 1A: Origin of life, evolution, classification, plant structure and function, and ecology. 0401.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

### **BIOL 2**

#### **Human Anatomy**

- 5 units, 4 hours lecture; 3 hours laboratory (GR or P/NP)
- Prerequisite: BIOL 10 or 24
- Acceptable for credit: CSU, UC

Detailed study of human body structure: Molecules, cells, tissues, organs and organ systems, basic physiology and cell division, selected human diseases. Laboratory work includes extensive use of microscopes, figures/charts, three-dimensional models, dissected human cadavers, and dissection of other mammalian organisms/organs. 0410.00

AA/AS area 1; CSU Area B2, B3; IGETC area 5B, 5C

C-ID BIOL 110B

### **BIOL 3**

#### **Microbiology**

- 5 units, 4 hours lecture, 4 hours laboratory (GR)
- Prerequisites: CHEM 1A or CHEM 30A
- Recommended Preparation: BIOL 10
- Acceptable for Credit: CSU, UC

Survey of the various microscopic agents of particular importance to humans: Emphasis on microbes involved in infectious diseases, host defenses against disease, elements of infectious chains and means utilized for breaking the chains. 0403.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

### **BIOL 4**

#### **Human Physiology**

- 5 units, 4 hours lecture; 3 hours laboratory (GR or P/NP)
- Prerequisite: CHEM 1A or 30A
- Recommended preparation: BIOL 2
- Acceptable for credit: CSU, UC

Detailed study of human body function: Molecules, cells, tissues, organs and organ systems, basic anatomy essential to understanding function, physical and chemical factors and processes, and selected human diseases. Laboratory work includes computer simulations and interactive programs, physiological experiments and demonstrations, and use of microscopes. 0410.00

AA/AS area 1; CSU Area B2, B3; IGETC area 5B, 5C

**BIOL 10****Introduction to Biology**

- 4 units, 3 hours lecture, 3 hours laboratory (GR or P/NP)
- Not open for credit to students who have completed or are currently enrolled in BIOL 1A or 1B.
- Students with previous credit in Biol 11 receive only 1 unit of credit for BIOL 10.
- Acceptable for credit: CSU, UC

Fundamentals of biology for the non-major: Scientific inquiry, biological chemistry, cell structure and function, DNA and genetics, evolution and ecology, and an overview of living organisms. Includes laboratory exercises designed to complement lectures. 0401.00  
AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

**BIOL 24****Basic Human Anatomy and Physiology**

- 4 units, 3 hours lecture, 3 hours laboratory (GR)
- Acceptable for Credit: CSU, UC

Fundamentals of the structure and function of the human body from an organ system perspective: Key concepts and basic principles of the chemistry of life and organic compounds, cells and tissues, cell physiology, organ systems, selected human diseases. Laboratory work includes use of microscopes, figures/charts, three-dimensional models, dissection of mammalian organs and demonstration of human cadavers. 0410.00

AA/AS area 1; CSU area B2, B3; IGETC area 5B, 5C

**BIOL 31****Nutrition**

- 4 units, 4 hours lecture (GR or P/NP)
- Not open for credit to students who have completed or are currently enrolled in BIOL 28 at Laney College or NUTR 10 at Merritt College.
- Acceptable for credit: CSU, UC

Principles of human nutrition: Nutrients, their function and food sources; problems of excess and deficiency; dietary goals for health promotion and disease prevention. 0401.00

CSU area E

**BIOL 48AA-FZ****Selected Topics in Biological Sciences**

- .5-5 units, 0-5 hours lecture, 0-15 hours laboratory
- (GR or P/NP)
- Acceptable for credit: CSU

See section on Selected Topics. 0401.00

**BIOL 102****Fundamentals of Oceanography**

- 4 units, 3 hours lecture, 3 hours laboratory (GR)
- Eligible for credit by examination
- Acceptable for Credit: CSU, UC

Introduction to geological, chemical, physical and biological aspects of oceans and interactions among them: History of oceanography; plate tectonics and marine geology; the marine-land interface; oceans' roles as a dominant influence on the earth, its climate, and the lives of its inhabitants; global and local ocean resource management, and preservation of marine environments; and the deep sea: properties, animals and adaptations; analysis of data collected on research trips to local bay environments. 1919.00

AA/AS area 1; CSU area B1, B2, B3; IGETC area 5A, 5B, 5C

**BIOL 248AA-FZ****Selected Topics in Biological Sciences**

- .5-5 units, 0-5 hours lecture, 0-15 hours laboratory
- (GR or P/NP)

See section on Selected Topics. 0401.00