

# BS BIOLOGICAL SCIENCES

## Program Learning Objectives

1. Explain fundamental concepts of biology in the following areas: diversity & evolution; structure and function at multiple hierarchical levels; information flow; energy and matter transformations; interactions among and between organisms and the environment.
2. Demonstrate proficiency in the appropriate lab and field techniques in their area of specialization in biology.
3. Locate and critically evaluate the scientific literature.
4. Apply the process of science to design, conduct, analyze and interpret experiments in biology.
5. Integrate statistics, math, physical sciences and technology to answer biological questions.
6. Communicate biological principles and research findings effectively to diverse audiences.
7. Relate ethical, social justice or global perspectives to the study and practice of biology.

## Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation section of this catalog, including:

- 60 units of upper-division courses
- Graduation Writing Requirement (GWR)
- 2.0 GPA
- U.S. Cultural Pluralism (USCP)

Note: No Major, Support or Concentration courses may be selected as credit/no credit.

### MAJOR COURSES

BIO 160	Diversity and History of Life	4
BIO 161	Introduction to Cell and Molecular Biology (B2 & B3) <sup>1</sup>	4
BIO 162	Introduction to Organismal Form and Function	4
BIO 263	Introductory Ecology and Evolution	4
BIO 351	Principles of Genetics	5
BIO 413	Evolutionary Medicine	4
or BIO 414	Evolution	
BIO 461	Senior Project - Research Proposal	2
or BIO 462	Senior Project Research Experience	

### Ecology <sup>3</sup>

Select from the following: 4

BIO 327	Wildlife Ecology	
BIO 363	Principles of Conservation Biology	
BIO 442	Behavioral Ecology	
BOT 326	Plant Ecology	
MCRO 436	Microbial Ecology	
MSCI 300	Marine Ecology	

### Physiology <sup>2,3</sup>

Select from the following: 4

BIO 361	Principles of Animal Physiology	
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BIO 434	Environmental Physiology	
BIO 435	Plant Physiology	
<b>Concentration or General Curriculum in Biology <sup>3</sup></b>		
(See list of Concentrations and General Curriculum in Biology below)		43
<b>SUPPORT COURSES</b>		
CHEM 127	General Chemistry for Agriculture and Life Science I (B1 & B3) <sup>1</sup>	4
CHEM 128	General Chemistry for Agriculture and Life Science II	4
CHEM 129	General Chemistry for Agriculture and Life Science III	4
CHEM 216	Organic Chemistry I <sup>4</sup>	5
or CHEM 312	Survey of Organic Chemistry	
MATH 161	Calculus for the Life Sciences I (B4) <sup>1</sup>	4
MATH 162	Calculus for the Life Sciences II (GE Electives) <sup>1</sup>	4
PHYS 121	College Physics I	4
PHYS 122	College Physics II	4
PHYS 123	College Physics III	4
STAT 218	Applied Statistics for the Life Sciences	4
<b>GENERAL EDUCATION (GE)</b>		
(See GE program requirements below.)		56
<b>FREE ELECTIVES</b>		
Free Electives <sup>5</sup>		5
Total units		180

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.

<sup>2</sup> Students planning to take Anatomy and Physiology courses should take BIO 361 to fulfill this requirement.

<sup>3</sup> Courses taken to meet a Major or Support requirement cannot be double-counted in a concentration or in the General Curriculum.

<sup>4</sup> Students in the Molecular and Cellular Biology concentration should take CHEM 216 to fulfill this requirement.

<sup>5</sup> If a General Education (GE) course is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.

## General Curriculum in Biology or Concentrations (Select one)

- General Curriculum in Biology (<http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/biologicalsciences/bsbiologicalsciences/generalcurriculuminbiologyconcentration/>)
- Anatomy and Physiology (<http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/biologicalsciences/bsbiologicalsciences/anatomyandphysiologyconcentration/>)
- Ecology, Evolution, Biodiversity, and Conservation (<http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/biologicalsciences/bsbiologicalsciences/ecologyevolutionbiodiversityandconservationconcentration/>)

- Molecular and Cellular Biology (<http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/biologicalsciences/bsbiologicalsciences/molecularandcellularbiologyconcentration/>)

GE Electives (4 units in Support plus 4 units in GE) <sup>1</sup>	4
<b>Total units</b>	<b>56</b>

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.

## General Education (GE) Requirements

- 72 units required, 16 of which are specified in Major and/or Support.
- If any of the remaining 56 units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (<http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>).
- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

<b>Area A</b>	<b>English Language Communication and Critical Thinking</b>	
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
<b>Area B</b>	<b>Scientific Inquiry and Quantitative Reasoning</b>	
B1	Physical Science (4 units in Support) <sup>1</sup>	0
B2	Life Science (4 units in Major) <sup>1</sup>	0
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (4 units in Support) <sup>1</sup>	0
Upper-Division B		4
<b>Area C</b>	<b>Arts and Humanities</b>	
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English	4
Lower-Division C Elective - Select a course from either C1 or C2		4
Upper-Division C		4
<b>Area D</b>	<b>Social Sciences</b>	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
D2	Lower-Division D - Select courses from two different subject prefixes.	8
Upper-Division D		4
<b>Area E</b>	<b>Lifelong Learning and Self-Development</b>	
Lower-Division E		4
<b>GE Electives in Areas B, C, and D</b>		
Select courses from two different areas; may be lower-division or upper-division courses.		