BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN ECOLOGY ROADMAP

120 Total Units Required

Minimum Number of Units in the Major: 67

**Course** | **Title** | **Units**
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**First Semester**
CHEM 115 | General Chemistry I: Essential Concepts of Chemistry | 5
Lower Division Requirement (16-17 Units) – Take One | 4-5
GE Area A: Oral Communication (A1) or Critical Thinking (A3) | 3
GE Area A: Written English Communication (A2) | 3

**Units** | **15-16**
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**Second Semester**
BIOL 230 | Introductory Biology I | 5
Lower Division Requirement (16-17 Units) – Take One | 4-5
GE Area A: Oral Communication (A1) or Critical Thinking (A3) | 3
GE Area A: Written English Communication II (A4) if not already satisfied | 3
or SF State Studies or University Elective | 2
GE Area D: U.S. History (D2) or U.S. and California Government (D3) | 3

**Units** | **15-16**
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**Third Semester**
BIOL 240 | Introductory Biology II | 5
Lower Division Requirement (16-17 Units) – Take One | 4-5
GE Area A: Written English Communication II (A4) if not already satisfied | 3
or SF State Studies or University Elective | 2
GE Area D: U.S. History (D2) or U.S. and California Government (D3) | 3

**Units** | **15-16**
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**Fourth Semester**
CHEM 130 | General Organic Chemistry | 3
Lower Division Requirement (16-17 Units) – Take One | 4-5
GE Area C: Arts (C1) | 3
GE Area D: U.S. History (D2) or U.S. and California Government (D3) | 3
SF State Studies or University Elective | 2

**Units** | **15-16**
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**Fifth Semester**
BIOL 355 | Genetics | 3
BIOL 458 | Biometry | 4
GE Area C: Arts (C1) or Humanities (C2) | 3
GE Area C: Humanities: Literature (C3) | 3
GE Area D: Social Sciences (D1) | 3

**Units** | **16**
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**Sixth Semester**
BIOL 337 | Evolution | 3
BIOL 525 or BIOL 630 | Plant Physiology or Animal Physiology | 3
Major Upper Division Electives (11–14 Units Total) | 2-4
GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course) | 3
GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course) | 3

**Units** | **14-16**
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**Seventh Semester**
Major Upper Division Requirement (6–8 Units Total) | 4
Major Upper Division Electives (11–14 Units Total) | 8
SF State Studies or University Elective | 3

**Units** | **15**
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**Eighth Semester**
Select Major Upper Division Requirement (6–8 Units Total) | 4-6
Major Upper Division Electives (11–14 Units Total) | 2-4
SF State Studies or University Elective | 9

**Units** | **15-19**
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1. **Major Lower Division Requirement**
CHEM 215 General Chemistry II: Quantitative Applications of Chemistry Concepts (3 units)
& CHEM 216 General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (2 units)
MATH 226 Calculus I (4 units)*
MATH 227 Calculus II (4 units)
PHYS 111 General Physics I (3 units)
& PHYS 112 General Physics I Laboratory (1 units)
PHYS 121 General Physics II (3 units)
& PHYS 122 General Physics II Laboratory (1 units)
*Depending on courses completed through Early Start and in high school, students in Pathway/Category 3 or 4 may be required to enroll in additional courses before they can take MATH 199 or MATH 226. Most students in Pathway/Category 3 or 4 will need to take a stretch format for MATH 199 (MATH 197 in Fall 2018 and MATH 198 in Spring 2019). Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

2. To avoid taking additional units, it is recommended that you meet LLD and SF State Studies requirements (AERM, GP, ES, SJ) within your GE.

3. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

4. Areas B2 (Life Science) and B3 (Laboratory Science) are satisfied upon completion of BIOL 240.

5. Area B1 (Physical Science) is satisfied upon completion of CHEM 130 or CHEM 233.
6. Upper Division General Education, Physical, and Life Sciences (UD-B) is satisfied upon completion of BIOL 355.

7. **Major Upper Division Electives**
   Select 11-14 units upon advisement from the alternates not used in fulfilling the requirements listed above, or any other upper division biology courses not specifically excluded for major credit, or any graduate course in biology.

8. **Major Upper Division Requirement**
   Select 6-8 units on advisement from the following:
   - BIOL 482 Ecology (4 units)
   - BIOL 490 Ecology of Infectious Diseases (4 units)
   - BIOL 529GW Plant Ecology - GWAR (4 units)
   - BIOL 530 Conservation Biology (3 units)
   - BIOL 532 Restoration Ecology (3 units)
   - BIOL 534 Wetland Ecology (4 units)
   - BIOL 577 Ecological and Environmental Modeling (4 units)
   - BIOL 580 Limnology (3 units)
   - BIOL 582 Biological Oceanography (4 units)
   - BIOL 585 Marine Ecology (3 units)
   - BIOL 586 Marine Ecology Laboratory (2 units)