BACHELOR OF ARTS IN 
GENERAL BIOLOGY - 
QUANTITATIVE REASONING 
CATEGORY I/II AND ENG 114

120 Total Units Required
Minimum Number of Units in the Major: 57

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>First Semester</td>
<td>CHEM 115</td>
<td>5</td>
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<tr>
<td></td>
<td>General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core)</td>
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<tr>
<td></td>
<td>ENG 114</td>
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<tr>
<td></td>
<td>Writing the First Year: Finding Your Voice (A2)¹</td>
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<td></td>
<td>MATH 124 or MATH 226</td>
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<tr>
<td></td>
<td>Elementary Statistics (Major Lower-Division Core, B4)² or Calculus I</td>
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<tr>
<td></td>
<td>PHYS 111 &amp; PHYS 112</td>
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<tr>
<td></td>
<td>General Physics I and General Physics I Laboratory (Major Lower-Division Core, B1, B3)</td>
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<tr>
<td>Second Semester</td>
<td>BIOL 230</td>
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<tr>
<td></td>
<td>Introductory Biology I (Major Lower-Division Core)</td>
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<tr>
<td></td>
<td>PHYS 121 &amp; PHYS 122</td>
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<td>General Physics II and General Physics II Laboratory (Major Lower-Division Core)</td>
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<tr>
<td></td>
<td>GE Area A³</td>
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<td>GE Area E</td>
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<td>Units</td>
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<td>Third Semester</td>
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<td>Introductory Biology II (Major Lower-Division Core)</td>
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<td>CHEM 215</td>
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<td></td>
<td>General Chemistry II: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core)</td>
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<td>GE Area A</td>
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<tr>
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<td>GE Area C</td>
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<tr>
<td></td>
<td>Complementary Studies or SF State Studies or University Elective⁴</td>
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<td>Units</td>
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<td>Fourth Semester</td>
<td>CHEM 130</td>
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<td>General Organic Chemistry (Major Lower-Division Core)</td>
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<td></td>
<td>Ecology Course - Select One⁵</td>
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<td>GE Area C</td>
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<td>GE Area D - Take Two</td>
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<td>Units</td>
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<td>Fifth Semester</td>
<td>BIOL 355</td>
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<td>Genetics (Major Upper-Division Core)</td>
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<td>Physiology Course - Select One⁶</td>
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<td>Physiology Lab or University Elective⁷</td>
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<td>GE Area C</td>
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<td></td>
<td>GE Area D</td>
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<td>Units</td>
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<td>Sixth Semester</td>
<td>Cell Biology Course - Select One⁸</td>
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<td>Cell Biology Lab or University Elective⁷</td>
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<td>Evolutionary or Organismal Biology Course - Select One⁹</td>
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<td>GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)</td>
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<td>Units</td>
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<td>Seventh Semester</td>
<td>Upper-Division Major Electives - Select 4-8 Units in Consultation with an Advisor¹⁰</td>
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<td>GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)</td>
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<td>SF State Studies or University Elective - Take Three⁴</td>
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<td>Units</td>
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<td>Eighth Semester</td>
<td>Upper-Division Major Electives - Take One¹⁰</td>
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<tr>
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<td>or University Elective if already satisfied</td>
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<tr>
<td></td>
<td>SF State Studies or University Elective - Take Four⁴</td>
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<tr>
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<td>Units</td>
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<td>Total Units</td>
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</tbody>
</table>

1 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.

2 Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center. Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website.

3 To avoid taking additional units, it is recommended that you meet SF State Studies requirements (AERM, GP, ES, SJ) within your GE.
4 Complementary Studies
Students in the B.A. Biology program will satisfy the Complementary Studies Requirement with the completion of courses in chemistry, physics, and mathematics that are required for the major.

5 Ecology Courses - Select One
BIO 482 Ecology (4 units)
BIO 490 Ecology of Infectious Diseases (4 units)
BIO 529GW Plant Ecology - GWAR (4 units)*
BIO 532 Restoration Ecology (3 units)
BIO 534 Wetland Ecology (4 units)
BIO 580 Limnology (3 units)
BIO 582 Biological Oceanography (4 units)
BIO 585 Marine Ecology (3 units)
BIO 586 Marine Ecology Laboratory (2 units)

6 Physiology Courses
BIO 442 Microbial Physiology (3 units)
BIO 525 Plant Physiology (3 units)
BIO 612 Human Physiology (3 units)
BIO 630 Animal Physiology (3 units)

7 Select One Laboratory Course Associated with the Physiology or Cell Biology Course Taken (Only One Laboratory Course is Required)
BIO 351GW Experiments in Cell and Molecular Biology - GWAR (4 units)*
BIO 402GW General Microbiology Laboratory - GWAR (3 units)*
BIO 443 Microbial Physiology Laboratory (2 units)
BIO 454 Parasitology Laboratory (1 units)
BIO 526 Plant Molecular Physiology Laboratory (2 units)
BIO 613GW Human Physiology Laboratory - GWAR (3 units)*
BIO 631GW Animal Physiology Laboratory - GWAR (4 units)*

8 Cell Biology Courses
BIO 350 Cell Biology (3 units)
BIO 358 Forensic Genetics: Math Matters (4 units)
BIO 401 General Microbiology (3 units)
BIO 435 Immunology (3 units)
BIO 453 General Parasitology (3 units)
CHEM 349 General Biochemistry (3 units)

9 Evolutionary or Organismal Biology Courses
BIO 328 Human Anatomy (4 units)
BIO 337 Evolution (3 units)
BIO 380 Evolutionary Developmental Biology (3 units)
BIO 382 Developmental Biology (3 units)
BIO 425 Emerging Diseases (3 units)
BIO 453 General Parasitology (3 units)
BIO 454 Parasitology Laboratory (1 units)
BIO 460 General Entomology (4 units)
BIO 475GW Herpetology - GWAR (3 units)*
BIO 478GW Ornithology - GWAR (4 units)*
BIO 500 Evolution and Diversity of Plants (4 units)
BIO 502 Biology of the Algae (3 units)
BIO 504 Biology of the Fungi (4 units)
BIO 514 Plant Taxonomy (5 units)
BIO 525 Plant Physiology (3 units)
BIO 526 Plant Molecular Physiology Laboratory (2 units)
BIO 529GW Plant Ecology - GWAR (4 units)*
BIO 530 Conservation Biology (3 units)
BIO 532 Restoration Ecology (3 units)
BIO 534 Wetland Ecology (4 units)
BIO 550 Plant and Animal Interactions (4 units)
BIO 555 Marine Invertebrate Zoology (4 units)
BIO 556 Natural History of Marine Invertebrates (4 units)
BIO 570GW Biology of Fishes - GWAR (4 units)*
BIO 577 Ecological and Environmental Modeling (4 units)
BIO 580 Limnology (3 units)
BIO 582 Biological Oceanography (4 units)
BIO 600 Animal Behavior (3 units)
BIO 607 Conservation and Management of Marine Mammals (3 units)
BIO 609 Physics in Medicine (3 units)
BIO 612 Human Physiology (3 units)
BIO 614 Vertebrate Histology (4 units)
BIO 616 Cardiorespiratory Physiology (3 units)
BIO 620 Endocrinology (3 units)
BIO 621 Reproductive Physiology (3 units)
BIO 622 Hormones and Behavior (3 units)
BIO 623 Pharmacology (3 units)
BIO 627 Biophysics (3 units)
BIO 630 Animal Physiology (3 units)
BIO 638 Bioinformatics and Genome Annotation (4 units)
BIO 640 Cellular Neurosciences (3 units)
BIO 652 Science Education Partners in Biology (4 units)

A Students must complete at least one GWAR course in order to graduate.

10 Upper-Division Electives (4-8 units)
Select four to eight units in consultation with an advisor from among all upper-division Biology courses. Only one of the following courses can be included among those selected: BIO 317, BIO 327, BIO 330, and BIO 349. Up to three units of BIO 699 can also be used towards the total of four to eight units. All Biology courses that have BIO 230 and/or BIO 240 as prerequisites can also be used as electives. This includes courses already listed previously under each of the category subheadings, but not used to satisfy the requirements of those categories.

BIO 332 Health Disparities in Cancer (3 units) (AERM, GP, SJ)
BIO 337 Evolution (3 units)
BIO 344GW Research Skills - GWAR (3 units)*
BIO 350 Cell Biology (3 units)
BIO 358 Forensic Genetics: Math Matters (4 units)
BIO 401 General Microbiology (3 units)
BIO 425 Emerging Diseases (3 units)
BIO 453 General Parasitology (3 units)
BIO 460 General Entomology (4 units)
BIO 461 Insect Taxonomy (4 units)
BIO 464 Medical Entomology (3 units)
BIO 470 Natural History of Vertebrates (4 units)
BIO 475GW Herpetology - GWAR (3 units)*
BIO 478GW Ornithology - GWAR (4 units)*
BIO 482 Ecology (4 units)
BIO 490 Ecology of Infectious Diseases (4 units)
BIO 492 Comparative Anatomy of Vertebrates (4 units)
BIO 500 Evolution and Diversity of Plants (4 units)
BIO 502 Biology of the Algae (3 units)
BIO 504 Biology of the Fungi (4 units)
BIO 514 Plant Taxonomy (5 units)
BIO 525 Plant Physiology (3 units)
BIO 526 Plant Molecular Physiology Laboratory (2 units)
BIO 529GW Plant Ecology - GWAR (4 units)*
BIO 530 Conservation Biology (3 units)
BIO 532 Restoration Ecology (3 units)
BIO 534 Wetland Ecology (4 units)
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* Students must complete at least one GWAR course in order to graduate.