# Bachelor of Arts in General Biology Roadmap

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 115</td>
<td>General Chemistry I: Essential Concepts of Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>MATH 124 or MATH 226</td>
<td>Elementary Statistics or Calculus I</td>
<td>3-4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication (A2)</td>
<td>3</td>
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</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td>14-15</td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 230</td>
<td>Introductory Biology I</td>
<td>5</td>
</tr>
<tr>
<td>PHYS 111 &amp; PHYS 112</td>
<td>General Physics I and General Physics I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication II (A4)</td>
<td>3</td>
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</tr>
<tr>
<td>or Written English Communication (A2) Stretch II</td>
<td></td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>15</td>
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<tr>
<td><strong>Third Semester</strong></td>
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<tr>
<td>BIOL 240</td>
<td>Introductory Biology II</td>
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</tr>
<tr>
<td>CHEM 215</td>
<td>General Chemistry II: Quantitative Applications of Chemistry Concepts</td>
<td>3</td>
</tr>
<tr>
<td>GE Area C: Arts (C1) or Humanities (C2)</td>
<td>3</td>
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</tr>
<tr>
<td>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</td>
<td>3</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>14</td>
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<tr>
<td><strong>Fourth Semester</strong></td>
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<tr>
<td>CHEM 130</td>
<td>General Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 121 &amp; PHYS 122</td>
<td>General Physics II and General Physics II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Written English Communication II (A4) if not already satisfied</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or SF State Studies or University Elective</td>
<td></td>
<td></td>
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<tr>
<td>GE Area D: Social Sciences (D1)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>16</td>
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<tr>
<td><strong>Fifth Semester</strong></td>
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<tr>
<td>BIOL 355</td>
<td>Genetics</td>
<td>3</td>
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<tr>
<td>Ecology Course – Select One</td>
<td>3-5</td>
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<tr>
<td>Laboratory Course Associated with a Course in the Physiology or Cell Biology Course – Select One</td>
<td>2-4</td>
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<tr>
<td>GE Area C: Arts (C1)</td>
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<tr>
<td>GE Area C: Humanities: Literature (C3)</td>
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<tr>
<td><strong>Units</strong></td>
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<td>14-18</td>
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<tr>
<td><strong>Sixth Semester</strong></td>
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<tr>
<td>Cell Biology Course – Select One</td>
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<tr>
<td>Evolutionary or Organismal Biology Course – Select One</td>
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<tr>
<td>GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course)</td>
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<tr>
<td>SF State Studies or University Elective – Take Two</td>
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<td><strong>Units</strong></td>
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<tr>
<td><strong>Seventh Semester</strong></td>
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<tr>
<td>Physiology Course – Select One</td>
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<tr>
<td>Upper Division Major Electives – Select 4-8 Units in Consultation with an Advisor</td>
<td>4</td>
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<tr>
<td>GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course)</td>
<td>3</td>
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</tr>
<tr>
<td>SF State Studies or University Elective – Take Two</td>
<td>6</td>
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<tr>
<td><strong>Units</strong></td>
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<td>16</td>
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<tr>
<td><strong>Eighth Semester</strong></td>
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<td>Upper Division Major Electives</td>
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<tr>
<td>or University Elective if already satisfied</td>
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<tr>
<td>SF State Studies or University Elective – Take Four</td>
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<tr>
<td><strong>Units</strong></td>
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<td>15</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
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<td>120-125</td>
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</tbody>
</table>

1 Depending on courses completed through Early Start and in high school, students in Pathway/Category 3 or 4 may be required to enroll in a support course to complement their MATH 124 course (MATH 124 concurrently with MATH 123) or additional courses before they can take MATH 226. 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 Ecology Courses

5 Depending on courses completed through Early Start and in high school, students in Pathway/Category 3 may be required to complete Biology, Physics, or Chemistry courses.

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

7 Depending on courses completed through Early Start and in high school, students in Pathway/Category 3 or 4 may be required to complete Biology, Physics, or Chemistry courses.
**Cell Biology Courses**

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

**Physiology Courses**

- BIOL 442 Microbial Physiology (3 units)
- BIOL 525 Plant Physiology (3 units)
- BIOL 612 Human Physiology (3 units)
- BIOL 630 Animal Physiology (3 units)

**Laboratory Course Associated with a Course in the Physiology or Cell Biology Course**

- BIOL 351GW Experiments in Cell and Molecular Biology - GWAR (4 units)
- BIOL 402GW General Microbiology Laboratory - GWAR (3 units)
- BIOL 436 Immunology Laboratory (2 units)
- BIOL 443 Microbial Physiology Laboratory (2 units)
- BIOL 454 Parasitology Laboratory (1 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 units)
- BIOL 613GW Human Physiology Laboratory - GWAR (3 units)
- BIOL 631GW Animal Physiology Laboratory - GWAR (4 units)

**Evolutionary or Organismal Biology Courses**

- BIOL 328 Human Anatomy (4 units)
- BIOL 337 Evolution (3 units)
- BIOL 380 Evolutionary Developmental Biology (3 units)
- BIOL 382 Developmental Biology (3 units)
- BIOL 425 Emerging Diseases (3 units)
- BIOL 453 General Parasitology (3 units)
- BIOL 454 Parasitology Laboratory (1 units)
- BIOL 460 General Entomology (4 units)
- BIOL 475GW Herpetology - GWAR (3 units)
- BIOL 478GW Ornithology - GWAR (4 units)
- BIOL 482 Ecology (4 units)
- BIOL 490 Ecology of Infectious Diseases (4 units)
- BIOL 492 Comparative Anatomy of Vertebrates (4 units)
- BIOL 500 Evolution and Diversity of Plants (4 units)
- BIOL 502 Biology of the Algae (3 units)
- BIOL 504 Biology of the Fungi (4 units)
- BIOL 514 Plant Taxonomy (5 units)
- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 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 550 Plant and Animal Interactions (4 units)
- BIOL 555 Marine Invertebrate Zoology (4 units)
- BIOL 556 Natural History of Marine Invertebrates (4 units)
- BIOL 570GW Biology of Fishes - GWAR (4 units)
- BIOL 577 Ecological and Environmental Modeling (4 units)
- BIOL 580 Limnology (3 units)
- BIOL 582 Biological Oceanography (4 units)
- BIOL 600 Animal Behavior (3 units)
- BIOL 607 Conservation and Management of Marine Mammals (3 units)
- BIOL 609 Physics in Medicine (3 units)
- BIOL 612 Human Physiology (3 units)
- BIOL 614 Vertebrate Histology (4 units)
- BIOL 616 Cardiorespiratory Physiology (3 units)
- BIOL 620 Endocrinology (3 units)
- BIOL 621 Reproductive Physiology (3 units)
- BIOL 622 Hormones and Behavior (3 units)
- BIOL 623 Pharmacology (3 units)
- BIOL 627 Biophysics (3 units)
- BIOL 630 Animal Physiology (3 units)
- BIOL 638 Bioinformatics and Genome Annotation (4 units)
- BIOL 640 Cellular Neurosciences (3 units)
- BIOL 652 Science Education Partners in Biology (4 units)

**Upper-Division Electives (4-8 units)**

- BIOL 240 Introductory Biology II (5 units)
- BIOL 332 Health Disparities in Cancer (3 units)
- BIOL 337 Evolution (3 units)
- BIOL 344GW Research Skills - GWAR (3 units)
- BIOL 350 Cell Biology (3 units)
- BIOL 358 Forensic Genetics: Math Matters (4 units)
- BIOL 401 General Microbiology (3 units)
- BIOL 425 Emerging Diseases (3 units)
- BIOL 453 General Parasitology (3 units)
- BIOL 460 General Entomology (4 units)
- BIOL 461 Insect Taxonomy (4 units)
- BIOL 464 Medical Entomology (3 units)
- BIOL 470 Natural History of Vertebrates (4 units)
- BIOL 475GW Herpetology - GWAR (3 units)
- BIOL 478GW Ornithology - GWAR (4 units)
- BIOL 482 Ecology (4 units)
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- BIOL 502 Biology of the Algae (3 units)
- BIOL 504 Biology of the Fungi (4 units)
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- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 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 550 Plant and Animal Interactions (4 units)
- BIOL 555 Marine Invertebrate Zoology (4 units)
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Substitutions allowed upon signed advisor consent.