# 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 I 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>
<td></td>
</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>
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<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>
<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>
<td>5</td>
</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>
<td></td>
</tr>
<tr>
<td>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td><strong>Fourth Semester</strong></td>
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<td></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>
</tr>
<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>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td>16</td>
</tr>
<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>
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<td>3-5</td>
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</tbody>
</table>

Laboratory Course Associated with a Course in the Physiology or Cell Biology Course – Select One | 2-4 |
GE Area C: Arts (C1) | 3   |
GE Area C: Humanities: Literature (C3) | 3   |
**Units** | 14-18 |
**Sixth Semester** | |   |
| Cell Biology Course – Select One | 3   |
| Evolutionary or Organismal Biology Course – Select One | 8   |
| GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course) | 3   |
| SF State Studies or University Elective – Take Two | 6   |
**Units** | 16    |
**Seventh Semester** | |   |
| Physiology Course – Select One | 6   |
| Upper Division Major Electives – Select 4-8 Units in Consultation with an Advisor | 1   |
| GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course) | 3   |
| SF State Studies or University Elective – Take Two | 6   |
**Units** | 16    |
**Eighth Semester** | |   |
| Upper Division Major Electives | 9   |
| or University Elective if already satisfied | 3   |
| SF State Studies or University Elective – Take Four | 12  |
**Units** | 15    |
**Total Units** | 120-125 |

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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
   - BIOL 482 Ecology (4 units)
   - BIOL 490 Ecology of Infectious Diseases (4 units)
   - BIOL 529GW Plant Ecology - GWAR (4 units)
   - BIOL 532 Restoration Ecology (3 units)
   - BIOL 534 Wetland Ecology (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)
5  **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)

6  **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)

7  **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)

8  **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)

9  **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)  
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)  
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BIOL 640 Cellular Neurosciences (3 units)  
BIOL 652 Science Education Partners in Biology (4 units)

10  Substitutions allowed upon signed advisor consent.