# 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>
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<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>
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<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</td>
<td></td>
<td>3</td>
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<tr>
<td>GE Area A: Written English Communication (A2)</td>
<td></td>
<td>3</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>14-15</td>
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</tbody>
</table>

| **Second Semester** | | |
| BIOL 230 | Introductory Biology I | 5 |
| PHYS 111 & PHYS 112 | General Physics I and General Physics I Laboratory | 4 |
| GE Area A: Oral Communication (A1) or Critical Thinking (A3) | | 3 |
| GE Area A: Written English Communication II (A4) | | 3 |
| **Units** | | 15 |

| **Third Semester** | | |
| BIOL 240 | Introductory Biology II | 5 |
| CHEM 215 | General Chemistry II: Quantitative Applications of Chemistry Concepts | 3 |
| GE Area C: Arts (C1) or Humanities (C2) | | 3 |
| GE Area D: U.S. History (D2) or U.S. and California Government (D3) | | 3 |
| **Units** | | 14 |

| **Fourth Semester** | | |
| CHEM 130 | General Organic Chemistry | 3 |
| PHYS 121 & PHYS 122 | General Physics II and General Physics II Laboratory | 4 |
| GE Area A: Written English Communication II (A4) if not already satisfied | | 3 |
| or SF State Studies or University Elective | | |
| GE Area D: Social Sciences (D1) | | 3 |
| GE Area D: U.S. History (D2) or U.S. and California Government (D3) | | 3 |
| **Units** | | 16 |

| **Fifth Semester** | | |
| BIOL 355 | Genetics | 3 |
| Ecology Course – Select One | | 3-5 |
| 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 | | 3-5 |
| 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 | | 3 |
| Upper Division Major Electives – Select 4-8 Units in Consultation with an Advisor | | 4 |
| 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 | | 3 |
| or University Elective if already satisfied | | |
| SF State Studies or University Elective – Take Four | | 12 |
| **Units** | | 15 |
| **Total Units** | | 120-125 |

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)
## 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 625 Biophysics (3 units)
- BIOL 630 Animal Physiology (3 units)
- BIOL 638 Bioinformatics and Genome Annotation (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)
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- BIOL 623 Pharmacology (3 units)
- BIOL 625 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)

Substitutions allowed upon signed advisor consent.