# Bachelor of Arts in Biology – BIOL Associate Degree for Transfer Roadmap

This is a sample pathway for students who transfer to San Francisco State University in the current Bulletin year with an AS-T in Biology. Thirty-two units in the major (BIOL 230/BIOL 240, CHEM 115/CHEM 215/CHEM 216, MATH 226, required PHYS sequence) and 33 units of lower-division GE requirements have been satisfied. Check with a major advisor about the most appropriate course sequence. **Degree completion guaranteed in 60 units; see the Associate Degree for Transfer (ADT) section for more information** [link](http://bulletin.sfsu.edu/undergraduate-admissions/transfer-students).

<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 130</td>
<td>General Organic Chemistry (Major Lower-Division)</td>
<td>3</td>
</tr>
<tr>
<td>GE Area C</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
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</tr>
<tr>
<td>US History (bulletin.sfsu.edu/undergraduate-education/graduation-requirements/#USHaGR)</td>
<td></td>
<td>3</td>
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<tr>
<td>or University Elective if US History met before transfer</td>
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<td></td>
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<tr>
<td>University Elective</td>
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<td>3</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 355</td>
<td>Genetics (Major Upper-Division)</td>
<td>3</td>
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<tr>
<td>Physiology Course - Select One</td>
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<td>5-7</td>
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<tr>
<td>Physiology Lab or University Elective</td>
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<td>3-4</td>
</tr>
<tr>
<td>Major Elective (4-8 units) - Take One</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>GE Area UD-C: Upper-Division Arts and/or Humanities</td>
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<td>3</td>
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<tr>
<td><strong>Units</strong></td>
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<tr>
<td><strong>Third Semester</strong></td>
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<tr>
<td>Cell Biology Course - Select One</td>
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<td>4-8</td>
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<tr>
<td>Cell Biology Lab or University Elective</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>Ecology Course - Select One</td>
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<td>3-4</td>
</tr>
<tr>
<td>GE Area UD-D: Upper-Division Social Sciences</td>
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</tr>
<tr>
<td>University Elective</td>
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<tr>
<td><strong>Units</strong></td>
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<td>15</td>
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<tr>
<td><strong>Fourth Semester</strong></td>
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<td></td>
</tr>
<tr>
<td>Evolutionary or Organismal Biology Course - Select One</td>
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<td>3-5</td>
</tr>
<tr>
<td>Major Elective (4-8 units) - Take One</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>Biology GWAR course</td>
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<td>3</td>
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<tr>
<td>or University Elective if requirement already met</td>
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<td></td>
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<tr>
<td>University Electives - Take Two</td>
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<td>6</td>
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<tr>
<td><strong>Units</strong></td>
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<tr>
<td><strong>Total Units</strong></td>
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<td>60</td>
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</tbody>
</table>

1. Upper-Division General Education: Physical, and Life Sciences (UD-B) is satisfied upon completion of BIOL 355.
2. **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)
3. **Select One Laboratory Course Associated with the Physiology or Cell Biology Course Taken (Only One Laboratory Course is Required)**
   - 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 unit)
   - BIOL 526 Plant Molecular Physiology Laboratory (2 units)
   - BIOL 613GW Human Physiology Laboratory - GWAR (3 units)
   - BIOL 631GW Animal Physiology Laboratory - GWAR (4 units)
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: BIOI 317, BIOI 327, BIOI 330, and BIOI 349. Up to three units of BIOI 699 can also be used towards the total of four to eight units. All Biology courses that have BIOI 230 and/or BIOI 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.
BIOI 332 Health Disparities in Cancer (3 units) (AERM, GP, SJ)
BIOI 337 Evolution (3 units)
BIOI 344GW Research Skills - GWAR (3 units)
BIOI 350 Cell Biology (3 units)
BIOI 358 Forensic Genetics: Math Matters (4 units)
BIOI 401 General Microbiology (3 units)
BIOI 425 Emerging Diseases (3 units)
BIOI 453 General Parasitology (3 units)
BIOI 460 General Entomology (4 units)
BIOI 461 Insect Taxonomy (4 units)
BIOI 464 Medical Entomology (3 units)
BIOI 470 Natural History of Vertebrates (4 units)
BIOI 475GW Herpetology - GWAR (3 units)
BIOI 478GW Ornithology - GWAR (4 units)
BIOI 482 Ecology (4 units)
BIOI 490 Ecology of Infectious Diseases (4 units)
BIOI 492 Comparative Anatomy of Vertebrates (4 units)
BIOI 500 Evolution and Diversity of Plants (4 units)
BIOI 502 Biology of the Algae (3 units)
BIOI 504 Biology of the Fungi (4 units)
BIOI 514 Plant Taxonomy (5 units)
BIOI 525 Plant Physiology (3 units)
BIOI 526 Plant Molecular Physiology Laboratory (2 units)
BIOI 529GW Plant Ecology - GWAR (4 units)
BIOI 530 Conservation Biology (3 units)
BIOI 532 Restoration Ecology (3 units)
BIOI 534 Wetland Ecology (4 units)
BIOI 550 Plant and Animal Interactions (4 units)
BIOI 555 Marine Invertebrate Zoology (4 units)
BIOI 556 Natural History of Marine Invertebrates (4 units)
BIOI 570GW Biology of Fishes - GWAR (4 units)
BIOI 577 Ecological and Environmental Modeling (4 units)
BIOI 580 Limnology (3 units)
BIOI 582 Biological Oceanography (4 units)
BIOI 600 Animal Behavior (3 units)
BIOI 607 Conservation and Management of Marine Mammals (3 units)
BIOI 609 Physics in Medicine (3 units)
BIOI 612 Human Physiology (3 units)
BIOI 614 Vertebrate Histology (4 units)
BIOI 616 Cardiorespiratory Physiology (3 units)
BIOI 620 Endocrinology (3 units)
BIOI 621 Reproductive Physiology (3 units)
BIOI 622 Hormones and Behavior (3 units)
BIOI 623 Pharmacology (3 units)
BIOI 627 Biophysics (3 units)
BIOI 630 Animal Physiology (3 units)
BIOI 638 Bioinformatics and Genome Annotation (4 units)
BIOI 640 Cellular Neurosciences (3 units)
BIOI 652 Science Education Partners in Biology (4 units)

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

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

Evolutionary or Organismal Biology Courses
BIOI 328 Human Anatomy (4 units)
BIOI 337 Evolution (3 units)
BIOI 380 Evolutionary Developmental Biology (3 units)
BIOI 382 Developmental Biology (3 units)
BIOI 425 Emerging Diseases (3 units)
BIOI 453 General Parasitology (3 units)
BIOI 454 Parasitology Laboratory (1 units)
BIOI 460 General Entomology (4 units)
BIOI 475GW Herpetology - GWAR (3 units)
BIOI 478GW Ornithology - GWAR (4 units)
BIOI 500 Evolution and Diversity of Plants (4 units)
BIOI 502 Biology of the Algae (3 units)
BIOI 504 Biology of the Fungi (4 units)
BIOI 505 Comparative Anatomy of Vascular Plants (4 units)
BIOI 514 Plant Taxonomy (5 units)
BIOI 517 Animal Taxonomy (4 units)
BIOI 532 Restoration Ecology (3 units)
BIOI 534 Wetland Ecology (4 units)
BIOI 555 Marine Invertebrate Zoology (4 units)
BIOI 570GW Biology of Fishes - GWAR (4 units)
BIOI 600 Animal Behavior (3 units)
BIOI 638 Bioinformatics and Genome Annotation (4 units)

The following courses fulfill the GWAR requirement:
BIOI 344GW Research Skills - GWAR (3 units)
BIOI 351GW Experiments in Cell and Molecular Biology - GWAR (4 units)
BIOI 435 Immunology (3 units)
BIOI 401 General Microbiology (3 units)
BIOI 453 General Parasitology (3 units)
BIOI 475GW Herpetology - GWAR (3 units)
BIOI 478GW Ornithology - GWAR (4 units)
BIOI 500 Evolution and Diversity of Plants (4 units)
BIOI 502 Biology of the Algae (3 units)
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BIOI 514 Plant Taxonomy (5 units)
BIOI 555 Marine Invertebrate Zoology (4 units)
BIOI 570GW Biology of Fishes - GWAR (4 units)
BIOI 600 Animal Behavior (3 units)
BIOI 638 Bioinformatics and Genome Annotation (4 units)

To Do at SF State:

Enough total units to reach 120 minimum for graduation; 40 units minimum at the upper-division level; to include the following:

University-Wide Requirements: 15-21 Units

- American Institutions (0-6 units): Courses may satisfy both American Institutions and Upper-Division GE if approved for multiple areas.
- Lower-Division GE (6 units): Area C (3 units in any subarea) and Area D (3 units). D2 satisfies US History if needed; D3 satisfies US/CA Government requirement if needed.)
Upper-Division GE (9 units): Courses required for the major may double-count if approved for UD GE.

B.A. Biology students satisfy Complementary Studies by taking courses in chemistry, physics, and mathematics that are required for the major.

General Biology Major: 24-33 Units
BIOL 230/BIOL 240, MATH 226, all PHYS, CHEM 115/CHEM 215/CHEM 216 met in transfer.

Lower-Division requirements (3 units): CHEM 130
Major Upper-Division Requirements/GWAR (17-22 units)
Major Upper-Division Electives (4-8 units)

University Electives: 7 or More Units
Depends on course choices made at the community college, how transferred units are applied to the requirements above, and course choices at SF State. Some courses may meet more than one requirement, e.g. both in UD GE and the major. Upper-division electives recommended in order to meet the minimum 40-unit requirement.