BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN BOTANY – 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, and the 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 (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>BIOL 355</td>
<td>Genetics (Major Upper-Division Core)</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 458</td>
<td>Biometry (Major Upper-Division Core)</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Ecology (Major Upper-Division Core)</td>
<td>4</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td><strong>14</strong></td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 337</td>
<td>Evolution (Major Upper-Division Core)</td>
<td>3</td>
</tr>
<tr>
<td>GWAR Option - Select One</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area UD-C: Upper-Division Arts and/or Humanities</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>University Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td><strong>Third Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology Elective (9 units total)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Physiology and Additional Electives (9 units total) - Take Two</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>GE Area UD-D: Upper-Division Social Sciences</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>University Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td><strong>Fourth Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology Elective (9 units total) - Take Two</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Physiology and Additional Electives (9 units total)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>University Elective - Take Two</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

---

1. **GWAR Course - Select One**
   - BIOL 475GW Herpetology - GWAR (3 units)
   - BIOL 478GW Ornithology - GWAR (4 units)
   - BIOL 529GW Plant Ecology - GWAR (4 units)
   - BIOL 570GW Biology of Fishes - GWAR (4 units)
   - BIOL 670GW Ecology and Evolution of Marine Systems I - GWAR (6 units)
Ecology and Evolution Electives - 9 units
- BIOL 380 Evolutionary Developmental Biology (3 units)
- BIOL 411 Environmental Microbiology (3 units)
- BIOL 453 General Parasitology (3 units)
- BIOL 460 General Entomology (4 units)
- BIOL 461 Insect Taxonomy (4 units)
- BIOL 470 Natural History of Vertebrates (4 units)
- BIOL 475GW Herpetology - GWAR (3 units)
- BIOL 478GW Ornithology - GWAR (4 units)
- BIOL 490 Ecology of Infectious Diseases (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 505 Comparative Anatomy of Vascular Plants (4 units)
- BIOL 514 Plant Taxonomy (5 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 555 Marine Invertebrate Zoology (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 & Limnology (4 units)
- BIOL 585 Marine Ecology (3 units)
- BIOL 600 Animal Behavior (3 units)
- BIOL 670GW Ecology and Evolution of Marine Systems I - GWAR (6 units)
- BIOL 671 Ecology and Evolution of Marine Systems II (6 units)
**Physiology and Additional Electives - 9 units**

- BIOL 315 Field Methods in Ecology and Evolution (1 units)
- BIOL 322 Human Sexuality: Integrative Science (3 units)
- BIOL 327 AIDS: Biology of the Modern Epidemic (3 units) (UD-B, GP)
- BIOL 328 Human Anatomy (4 units)
- BIOL 344GW Research Skills - GWAR (3 units)
- BIOL 349 Bioethics (3 units) (UD-B, SJ)
- BIOL 350 Cell Biology (3 units)
- BIOL 356 Honors Genetics (2 units)
- BIOL 357 Molecular Genetics (3 units)
- BIOL 358 Forensic Genetics: Math Matters (4 units)
- BIOL 382 Developmental Biology (3 units)
- BIOL 391 Microscopy and Photomicrography (2 units)
- BIOL 401 General Microbiology (3 units)
- BIOL 420 General Virology (3 units)
- BIOL 425 Emerging Diseases (3 units)
- BIOL 430 Medical Microbiology (3 units)
- BIOL 435 Immunology (3 units)
- BIOL 436 Immunology Laboratory (2 units)
- BIOL 442 Microbial Physiology (3 units)
- BIOL 443 Microbial Physiology Laboratory (2 units)
- BIOL 446 Microbial Genomics (4 units)
- BIOL 454 Parasitology Laboratory (1 units)
- BIOL 475GW Herpetology - GWAR (3 units)
- BIOL 478GW Ornithology - GWAR (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 505 Comparative Anatomy of Vascular Plants (4 units)
- BIOL 508 Plants and Human Affairs (3 units)
- BIOL 514 Plant Taxonomy (5 units)
- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 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 572 Colloquium in Ecology, Evolution, and Conservation (2 units)
- BIOL 575 Fisheries Biology (3 units)
- BIOL 577 Ecological and Environmental Modeling (4 units)
- BIOL 580 Limnology (3 units)
- BIOL 584 Marine Microbial Ecology Laboratory (1 units)
- BIOL 585 Marine Ecology (3 units)
- BIOL 586 Marine Ecology Laboratory (2 units)
- BIOL 600 Animal Behavior (3 units)
- BIOL 612 Human Physiology (3 units)
- BIOL 617 Environmental Physiology (3 units)
- BIOL 620 Endocrinology (3 units)
- BIOL 621 Reproductive Physiology (3 units)
- BIOL 622 Hormones and Behavior (3 units)
- BIOL 630 Animal Physiology (3 units)
- BIOL 638 Bioinformatics and Genome Annotation (4 units)
- BIOL 640 Cellular Neurosciences (3 units)
- BIOL 642 Neural Systems Physiology (3 units)
- BIOL 644 LEADers Service Learning Course: Learners Engaged in Advocating for Diversity in Science (4 units)
  or BIOL 652 Science Education Partners in Biology (4 units)
  or BIOL 654 Peer Assistants for Learning Science (PALS) (4 units)
To Do at SF State:

Enough total units to reach 120 minimum for graduation; 30 units minimum at the upper-division level; to include the following:

University-Wide Requirements: 12–18 Units

- Lower-Division GE (6 units) – Area C (3 units in any subarea) and Area D (3 units). D2 courses satisfy US History; D3 courses satisfy US/CA Government requirements.
- Upper-Division GE (9 units): Courses may satisfy the US History or US/CA Government requirements, and UD-C or UD-D at the same time, if approved for multiple areas.
- Students entering this major with the AS-T in Biology are not required to fulfill SF State Studies or Complementary Studies requirements.

University Electives: 8 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., in both UD GE and the major.