

# BACHELOR OF ARTS IN BIOLOGY – BIOL ASSOCIATE DEGREE FOR TRANSFER (ADT) ROADMAP

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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/>).**

## 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: 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 to meet the minimum 40-unit requirement.

Course	Title	Units
<b>First Semester</b>		
CHEM 130	General Organic Chemistry (Major Lower-Division)	3
GE Area C		3
GE Area D		3
US History ( <a href="http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#USHaGR">http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#USHaGR</a> ) or University Elective if US History met before transfer		3
University Elective		3
		<b>Units</b>
		<b>15</b>
<b>Second Semester</b>		
BIOL 355	Genetics (Major Upper-Division) <sup>1</sup>	3
Physiology Course - Select One <sup>2</sup>		5-7
Physiology Lab or University Elective <sup>3</sup>		
Major Elective (4-8 units) - Take One <sup>4</sup>		3-4
GE Area UD-C: Upper-Division Arts and/or Humanities		3
		<b>Units</b>
		<b>15</b>

**Third Semester**

Cell Biology Course - Select One <sup>5</sup>	4-8
Cell Biology Lab or University Elective <sup>3</sup>	
Ecology Course - Select One <sup>6</sup>	3-4
GE Area UD-D: Upper-Division Social Sciences	3
University Elective	2
	<b>Units</b>
	<b>15</b>

**Fourth Semester**

Evolutionary or Organismal Biology Course - Select One <sup>7</sup>	3-5
Major Elective (4-8 units) - Take One <sup>3</sup>	3-4
Biology GVAR course <sup>8</sup>	3
or University Elective if requirement already met	
University Electives - Take Two	6
	<b>Units</b>
	<b>15</b>
	<b>Total Units</b>
	<b>60</b>

<sup>1</sup> Upper-Division General Education: Physical, and Life Sciences (UD-B) is satisfied upon completion of BIOL 355.

**<sup>2</sup> 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)

**<sup>3</sup> 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 - GVAR (4 units)
- BIOL 402GW General Microbiology Laboratory - GVAR (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 - GVAR (3 units)
- BIOL 631GW Animal Physiology Laboratory - GVAR (4 units)

**<sup>4</sup> Upper-Division Electives (4-8 units)**

Select 4-8 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: BIOL 317, BIOL 327, BIOL 330, and BIOL 349. Up to 3 units of BIOL 699 can also be used towards the total of 4-8 units.

All Biology courses that have BIOL 230 and/or BIOL 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.

- BIOL 332 Health Disparities in Cancer (3 units) (AERM, GP, SJ)
- BIOL 337 Evolution (3 units)
- BIOL 344GW (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 (units)
- BIOL 464 (units)
- BIOL 470 Natural History of Vertebrates (4 units)
- BIOL 475GW Herpetology - GVAR (3 units)
- BIOL 478GW Ornithology - GVAR (4 units)
- BIOL 482 Ecology (4 units)
- BIOL 490 Ecology of Infectious Diseases (4 units)
- BIOL 492 (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 Biodiversity and California Field Botany (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 ( units)  
BIOL 555 Marine Invertebrate Zoology (4 units)  
BIOL 556 ( units)  
BIOL 570GW Biology of Fishes - GWAR (4 units)  
BIOL 577 Climate and Ecological Interactions (4 units)  
BIOL 580 Limnology (3 units)  
BIOL 582 Biological Oceanography & Limnology (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 Sequence Analysis (4 units)  
BIOL 640 Cellular Neurosciences (3 units)  
BIOL 652 ( 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 **Ecology Courses - Select One**

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 & Limnology (4 units)  
BIOL 585 Marine Ecology (3 units)  
BIOL 586GW Marine Ecology Laboratory - GWAR (4 units)

7 **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 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 Plant Structure and Function (3 units)  
BIOL 514 Plant Biodiversity and California Field Botany (5 units)  
BIOL 555 Marine Invertebrate Zoology (4 units)  
BIOL 570GW Biology of Fishes - GWAR (4 units)  
BIOL 600 Animal Behavior (3 units)

- 8 BIOL 638 Bioinformatics and Sequence Analysis (4 units)  
The following courses fulfill the GWAR requirement:  
BIOL 344GW ( units)  
BIOL 351GW Experiments in Cell and Molecular Biology - GWAR (4 units)  
BIOL 402GW General Microbiology Laboratory - GWAR (3 units)  
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 586GW Marine Ecology Laboratory - GWAR (4 units)  
BIOL 613GW Human Physiology Laboratory - GWAR (3 units)  
BIOL 631GW Animal Physiology Laboratory - GWAR (4 units)