

# BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN MARINE SCIENCE – 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: 15–18 Units

- American Institutions (0-6 units): US History, US Government, CA Government.
- Lower-Division GE (6 units) - Area C (3 units in any subarea) and Area D (3 units).
- 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.

### Biology – Marine Biology Major: 32-36 Units

BIOL 230, BIOL 240, MATH 226, all PHYS, CHEM 115, CHEM 215, and CHEM 216 met in transfer.

- Lower-Division Requirements (4 units): BIOL 231, CHEM 130
- Major Upper-Division Requirements (22-25 units)
- Major Upper-Division Electives (6-7 units) – upon advisement.

### University Electives: 18 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.

Course	Title	Units
<b>First Semester</b>		
BIOL 231	Advising for Success as a Biology Major (Major Lower-Division)	1
CHEM 130	General Organic Chemistry (Major Lower-Division)	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
GE Area C		3
University Elective - Take Two		6
	<b>Units</b>	<b>16</b>
<b>Second Semester</b>		
BIOL 355	Genetics (Major Upper-Division) <sup>1</sup>	3
BIOL 458	Biometry (Major Upper-Division)	4
Oceanography Elective - Select One <sup>2</sup>		3-4
GE Area D		3

GE Area UD-C: Upper-Division Arts and/or Humanities		3
	<b>Units</b>	<b>16</b>
<b>Third Semester</b>		
BIOL 337	Evolution (Major Upper-Division)	3
GWAR Option - Select One <sup>3</sup>		3-4
GE Area UD-D: Upper-Division Social Sciences		3
University Elective - Take Two		6
	<b>Units</b>	<b>15</b>
<b>Fourth Semester</b>		
Major Upper-Division Electives (6-7 units) <sup>4</sup>		6-7
University Elective - Take Two		6
	<b>Units</b>	<b>13</b>
	<b>Total Units</b>	<b>60</b>

<sup>1</sup> BIOL 355 satisfies GE Area UD-B: Upper-Division Physical and/or Life Sciences.

<sup>2</sup> **Oceanography Elective - Select One**

BIOL 582 Biological Oceanography & Limnology (4 units)

CHEM 680 Chemical Oceanography (3 units)

ERTH 400 Earth Systems I (3 units)

ERTH 434 Coastal Processes (3 units)

ERTH 470 Physical Oceanography (4 units)

<sup>3</sup> **GWAR Option - Select One**

BIOL 344GW Research Skills - GWAR (3 units)

BIOL 475GW Herpetology - GWAR (3 units)

BIOL 478GW Ornithology - GWAR (4 units)

BIOL 570GW Biology of Fishes - GWAR (4 units)

BIOL 670GW Ecology and Evolution of Marine Systems I - GWAR (6 units)

<sup>4</sup> **Upper-Division Electives (6-7 units)**

BIOL 315 Field Methods in Ecology and Evolution (1 unit)

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 380 Evolutionary Developmental Biology (3 units)

BIOL 382 Developmental Biology (3 units)

BIOL 391 Microscopy and Photomicrography (2 units)

BIOL 401 General Microbiology (3 units)

BIOL 411 Environmental Microbiology (3 units)

BIOL 460 General Entomology (4 units)

BIOL 470 Natural History of Vertebrates (4 units)

BIOL 482 Ecology (4 units)

BIOL 502 Biology of the Algae (3 units)

BIOL 525 Plant Physiology (3 units)

BIOL 526 Plant Molecular Physiology Laboratory (2 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 556 Natural History of Marine Invertebrates (4 units)

BIOL 572 Colloquium in Ecology, Evolution, and Conservation (2 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)

BIOL 600 Animal Behavior (3 units)

BIOL 607 Conservation and Management of Marine Mammals (3 units)

BIOL 617 Environmental Physiology (3 units)

BIOL 630 Animal Physiology (3 units)

BIOL 631GW Animal Physiology Laboratory - GWAR (4 units)

BIOL 644 LEADerS Service Learning Course: Learners Engaged in Advocating for Diversity in Science (4 units)  
or BIOL 654 Peer Assistants for Learning Science (PALS) (4 units)  
BIOL 670GW Ecology and Evolution of Marine Systems I - GVAR (6 units)  
BIOL 671 Ecology and Evolution of Marine Systems II (6 units)  
BIOL 699 Independent Study in Biology (1-3 units)  
GEOG 629 Coastal and Marine Applications of GIS (3 units)  
MSCI 306 Marine Science Diving and Boating (2 units)