

BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN MARINE BIOLOGY AND LIMNOLOGY - QUANTITATIVE REASONING CATEGORY I/II AND STRETCH ENGLISH

120 Total Units Required

Minimum Number of Units in the Major: 66

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

Course	Title	Units
First Semester		
CHEM 115	General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core)	5
ENG 104	Writing the First Year: Finding Your Voice Stretch I ¹	3
MATH 226	Calculus I (Major Lower-Division Core, B4) ²	4
GE Area A ³		3
Units		15
Second Semester		
BIOL 230	Introductory Biology I (Major Lower-Division Core)	5
ENG 105	Writing the First Year: Finding Your Voice Stretch II (A2) ¹	3
PHYS 111 & PHYS 112	General Physics I and General Physics I Laboratory (Major Lower-Division Core, B1, B3)	4
GE Area C		3
Units		15
Third Semester		
BIOL 240	Introductory Biology II ⁴	5
Select One (Major Lower-Division Core):		4-5

CHEM 215 & CHEM 216	General Chemistry II: Quantitative Applications of Chemistry Concepts and General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (Prerequisites for BIOL 580)	3
MATH 227	Calculus II	3
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	3
GE Area A		3
GE Area E		3
Units		15-16
Fourth Semester		
CHEM 130	General Organic Chemistry (Major Lower-Division Core) ⁵	3
Select One (Major Lower-Division Core):		4-5
CHEM 215 & CHEM 216	General Chemistry II: Quantitative Applications of Chemistry Concepts and General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts	3
MATH 227	Calculus II	3
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	3
GE Area C		3
GE Area D - Take Two		6
Units		16-17
Fifth Semester		
BIOL 355	Genetics ⁶	3
BIOL 458	Biometry	4
GE Area C		3
GE Area D		3
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
Units		16
Sixth Semester		
BIOL 337	Evolution (Major Upper-Division Core)	3

BIOL 525 or BIOL 630	Plant Physiology (Major Upper- Division Core) or Animal Physiology	3
Major Upper-Division Electives (14-17 units) - Take One ⁷		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective		3
Units		15
Seventh Semester		
Major Upper-Division Core (3-5 units) - Take One ⁸		3-5
Major Upper-Division Electives (14-17 units) - Take Two ⁷		7
SF State Studies or University Elective		3
Units		13-15
Eighth Semester		
Major Upper-Division Electives (14-17 units) - Take Two ⁷		6
SF State Studies or University Elective - Take Three		9
Units		15
Total Units		120-124

¹ 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.

² Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. 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/>).

³ To avoid taking additional units, it is recommended that you meet **SF State Studies** requirements (AERM, GP, ES, SJ) within your GE or major.

⁴ GE Areas B2 (Life Science) and B3 (Laboratory Science) are satisfied upon completion of BIOL 240.

⁵ GE Area B1 (Physical Science) is satisfied upon completion of CHEM 130.

⁶ Upper-Division General Education, Physical, and Life Sciences (UD-B) is satisfied upon completion of BIOL 355.

⁷ **Major Upper-Division Core Options (3-5 units)**

BIOL 534 Wetland Ecology (4 units)
 BIOL 580 Limnology (3 units)
 BIOL 582 Biological Oceanography (4 units)
 BIOL 585 Marine Ecology (3 units)
 and BIOL 586 Marine Ecology Laboratory (2 units)

⁸ **Upper-Division Electives (14-17 units)**

- BIOL 502 Biology of the Algae (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 units)
- BIOL 532 Restoration Ecology (3 units)
- BIOL 555 Marine Invertebrate Zoology (4 units)
- BIOL 556 Natural History of Marine Invertebrates (4 units)
- BIOL 570GW Biology of Fishes - GVAR (4 units)*
- BIOL 575 Fisheries Biology (3 units)
- BIOL 584 Marine Microbial Ecology Laboratory (1 units)
- BIOL 586 Marine Ecology Laboratory (2 units)
- BIOL 631GW Animal Physiology Laboratory - GVAR (4 units)*
- CHEM 680 Chemical Oceanography (3 units)
- ERTH 434 Coastal Processes (3 units)
- ERTH 642 Watershed Assessment and Restoration (4 units)

* Students are required to complete at least one GVAR course in order to graduate.