

BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN PHYSIOLOGY - QUANTITATIVE REASONING CATEGORY III/IV AND ENG 114

120 Total Units Required

Minimum Number of Units in the Major: 67

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		
BIOL 230	Introductory Biology I (Major Lower-Division Core)	5
ENG 114	Writing the First Year: Finding Your Voice (A2) ¹	3
MATH 197	Prelude to Calculus I (Prerequisite for MATH 226) ^{2,3}	3
GE Area A ⁴		3
GE Area C		3
		Units
		17
Second Semester		
CHEM 115	General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core)	5
MATH 198	Prelude to Calculus II (Prerequisite for MATH 226, B4) ^{2,3}	3
GE Area A		3
GE Area D		3
GE Area E		3
		Units
		17
Third Semester		
BIOL 240	Introductory Biology II (Major Lower-Division Core)	5
CHEM 130	General Organic Chemistry (Major Lower-Division Core)	3

CHEM 215 & CHEM 216	General Chemistry II: Quantitative Applications of Chemistry Concepts and General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core)	5
MATH 226	Calculus I (Major Lower-Division Core, B4) ^{2,3}	4
		Units
		17

Fourth Semester

CHEM 233	Organic Chemistry I (Hidden Prerequisite for CHEM 335 and CHEM 340)	3
Select One (Major Lower-Division Core):		3-4
BIOL 358	Forensic Genetics: Math Matters	
BIOL 458	Biometry	
MATH 124	Elementary Statistics (B4) ²	
MATH 227	Calculus II ⁵	
Select One Set of Courses (Major Lower-Division Core): ⁶		4
PHYS 111 & PHYS 112	General Physics I and General Physics I Laboratory (B1, B3)	
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (B1, B3)	
GE Area C		3
		Units
		13-14

Fifth Semester

BIOL 355	Genetics (Major Upper-Division Core)	3
BIOL 612 or BIOL 630	Human Physiology (Major Physiology Core) or Animal Physiology	3
CHEM 335	Organic Chemistry II (Hidden Prerequisite for CHEM 340 and CHEM 349)	3
Select One Set of Courses (Major Lower-Division Core): ⁶		4
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	

PHYS 230 or PHYS 232	General Physics with Calculus II or General Physics with Calculus II Laboratory	
GE Area D		3
		Units 16
Sixth Semester		
BIOL 350	Cell Biology (Major Upper-Division Core)	3
CHEM 340 or CHEM 349	Biochemistry I (Major Upper-Division Core) or General Biochemistry	3
Physiology Core Courses (6 Units Total) ⁷		3
GE Area C		3
GE Area D		3
		Units 15
Seventh Semester		
Select One (Physiology Lab):		2-4
BIOL 526	Plant Molecular Physiology Laboratory	
BIOL 613GW	Human Physiology Laboratory - GVAR ⁸	
BIOL 631GW	Animal Physiology Laboratory - GVAR ⁸	
Physiology Core Courses (6 Units Total) ⁷		3
Major Upper-Division Electives (9-11 Units Total) – Take Two ⁹		4-7
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
		Units 15-17
Eighth Semester		
Major Upper-Division Electives (9-11 Units Total) – Take Two ⁹		4-7
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective		3
		Units 10-13
Total Units		120-126

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 QR Category III students with a grade of B or higher in high school pre-calculus in the past year may be able to enroll in MATH 226. Please see a department advisor.

⁴ To avoid taking additional units, it is recommended that you meet **SF State Studies** (AERM, GP, ES, SJ) and **Ethnic Studies requirements** within your GE or major.

⁵ Students must take MATH 227 if taking PHYS 220/PHYS 222

⁶ PHYS 111/PHYS 112 are prerequisites for PHYS 121/PHYS 122. PHYS 220/PHYS 222 are prerequisites for PHYS 230/PHYS 232.

⁷ **Physiology Core Courses (9 units)**

- BIOL 525 Plant Physiology (3 units)
- BIOL 612 Human Physiology (3 units)
- BIOL 616 Cardiorespiratory Physiology (3 units)
- BIOL 617 Environmental Physiology (3 units)
- BIOL 618 Biology of Aging (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 640 Cellular Neurosciences (3 units)
- BIOL 642 Neural Systems Physiology (3 units)

⁸ Students must complete at least one GVAR course in order to graduate.

⁹ **Guided Electives (9-11 units)**

Select 9-11 units in consultation with an advisor from the following: Criteria for elective units: one elective must contain a laboratory component, one elective must be chosen from each of the emphases listed below, and additional electives may be selected from the list of Physiology core courses and/or either of the emphases listed below.

Cellular and Molecular

- BIOL 351GW Experiments in Cell and Molecular Biology - GVAR (4 units)⁸
- BIOL 357 Molecular Genetics (3 units)
- BIOL 382 Developmental Biology (3 units)
- BIOL 435 Immunology (3 units)
- BIOL 615 Molecular Pathophysiology (3 units)
- BIOL 623 Pharmacology (3 units)
- BIOL 652 Science Education Partners in Biology (4 units)
- BIOL 699 Independent Study in Biology (1-3 units)
- BIOL 865 Advances in Physiology and Behavioral Biology (2 units)
- CHEM 343 Biochemistry I Laboratory (3 units)

Ecological, Anatomical, and Evolutionary

- BIOL 328 Human Anatomy (4 units)
- BIOL 337 Evolution (3 units)
- BIOL 482 Ecology (4 units)
- BIOL 504 Biology of the Fungi (4 units)
- BIOL 505 Comparative Anatomy of Vascular Plants (4 units)
- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 units)
- BIOL 529GW Plant Ecology - GVAR (4 units)⁸
- BIOL 555 Marine Invertebrate Zoology (4 units)
- BIOL 570GW Biology of Fishes - GVAR (4 units)⁸
- BIOL 585 Marine Ecology (3 units)
- BIOL 586 Marine Ecology Laboratory (2 units)
- BIOL 600 Animal Behavior (3 units)
- BIOL 614 Vertebrate Histology (4 units)
- BIOL 652 Science Education Partners in Biology (4 units)
- BIOL 699 Independent Study in Biology (1-3 units)
- BIOL 865 Advances in Physiology and Behavioral Biology (2 units)