

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

120 Total Units Required

Minimum Number of Units in the Major: 67

Course	Title	Units
First Semester		
BIOL 230	Introductory Biology I (Major Lower-Division Core)	5
ENG 104	Writing the First Year: Finding Your Voice Stretch I 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
ENG 105	Writing the First Year: Finding Your Voice Stretch II (A2) ¹	3
GE Area A		3
GE Area D		3
		Units 17
Third Semester		
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
GE Area E		3
		Units 15
Fourth Semester		
BIOL 240	Introductory Biology II (Major Lower-Division Core)	5
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)	
		Units 15-16
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 (10-11 Units Total) – Take Two ⁹		4-7
GE Area C		3
		Units 15-17
Eighth Semester		
Major Upper-Division Electives (10-11 Units Total) – Take Two ⁹		4-7
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		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 requirements (AERM, GP, ES, SJ) within your GE.

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)