

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

120 Total Units Required

Minimum Number of Units in the Major: 59

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
<b>First Semester</b>		
BIOL 230	Introductory Biology I (Major Lower-Division Core)	5
BIOL 231	Advising for Success as a Biology Major (Major Lower-Division Core)	1
ENG 104	Writing the First Year. Finding Your Voice Stretch I <sup>1</sup>	3
MATH 197	Prelude to Calculus I (Prerequisite for MATH 226) <sup>2,3</sup>	3
GE Area A <sup>4</sup>		3
		<b>Units 15</b>
<b>Second Semester</b>		
CHEM 115	General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division Core)	5
ENG 105	Writing the First Year. Finding Your Voice Stretch II (A2) <sup>1</sup>	3
MATH 198	Prelude to Calculus II (Prerequisite for MATH 226, B4) <sup>2,3</sup>	3
GE Area A		3
		<b>Units 14</b>
<b>Third Semester</b>		
BIOL 240	Introductory Biology II (Major Lower-Division Core)	5

CHEM 215	General Chemistry II: Quantitative Applications of Chemistry Concepts (Major Lower-Division Core)	3
MATH 226	Calculus I (Major Lower-Division Core, B4) <sup>2,3</sup>	4
GE Area E		3
		<b>Units 15</b>

## Fourth Semester

Select One (Major Lower-Division Core): <sup>5</sup>		3
CHEM 130	General Organic Chemistry	
CHEM 233	Organic Chemistry I	
Select One Set of Courses (Major Lower-Division Core): <sup>6</sup>		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 - Take Two		6
GE Area D		3
		<b>Units 16</b>

## Fifth Semester

BIOL 355	Genetics (Major Upper-Division Core)	3
Select One (Major Upper-Division Core):		3
BIOL 612	Human Physiology	
BIOL 630	Animal Physiology	
Select One (Major Lower-Division Core): <sup>5</sup>		3
CHEM 335	Organic Chemistry II	
SF State Studies or University Elective (if CHEM 130 taken)		
Select One Set of Courses (Major Lower-Division Core): <sup>6</sup>		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 C		3
		<b>Units 16</b>

## Sixth Semester

BIOL 337	Evolution (Major Upper-Division Core)	3
Select One (Major Upper-Division Core):		
CHEM 340	Biochemistry I	
CHEM 349	General Biochemistry	
GE Area D		3

GE Area F	3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)	3
U.S. and California Government ( <a href="http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg">http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg</a> )	3
<b>Units</b>	<b>15</b>
<b>Seventh Semester</b>	
Select One (Major Upper-Division Core):	3-4
BIOL 613GW Human Physiology Laboratory - GVAR	
BIOL 631GW Animal Physiology Laboratory - GVAR	
Major Upper-Division Electives (10 Units Total) <sup>7</sup>	6
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)	3
SF State Studies or University Elective	3
<b>Units</b>	<b>15-16</b>
<b>Eighth Semester</b>	
Major Upper-Division Electives (10 Units Total) <sup>7</sup>	4
SF State Studies or University Elective - Take Three	10
<b>Units</b>	<b>14</b>
<b>Total Units</b>	<b>120-121</b>

**7 Guided Electives (10 units)**

Select 10 units from the classes below; at least 6 units must be chosen from among the Group A courses.

*Group A*

- BIOL 328 Human Anatomy (4 units)
- BIOL 350 Cell Biology (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 623 Pharmacology (3 units)
- BIOL 640 Cellular Neurosciences (3 units)
- BIOL 642 Neural Systems Physiology (3 units)

*Group B*

- BIOL 435 Immunology (3 units)
- BIOL 453 General Parasitology (3 units)
- BIOL 454 Parasitology Laboratory (1 unit)
- BIOL 525 Plant Physiology (3 units)
- BIOL 526 Plant Molecular Physiology Laboratory (2 units)
- BIOL 615 Molecular Pathophysiology (3 units)
- BIOL 644 LEADerS Service Learning Course: Learners Engaged in Advocating for Diversity in Science (4 units) or BIOL 652 Science Education Partners in Biology (4 units) or BIOL 654 Peer Assistants for Learning Science (PALS) (4 units)
- BIOL 699 Independent Study in Biology (1-3 units)

<sup>1</sup> 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.

<sup>2</sup> 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/>).

<sup>3</sup> 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.

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

<sup>5</sup> CHEM 233 is a prerequisite for CHEM 335. If students plan to take CHEM 335, they must take CHEM 233.

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