

# BACHELOR OF SCIENCE IN BIOLOGY: CONCENTRATION IN MICROBIOLOGY ROADMAP

120 Total Units Required  
 Minimum Number of Units in the Major: 60

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>		
CHEM 115	General Chemistry I (Major Lower-Division Core)	4
ENG 114	Writing the First Year: Finding Your Voice (A2) <sup>1</sup>	3
MATH 226	Calculus I (Major Lower-Division Core, B4) <sup>2</sup>	4
GE Area A <sup>3</sup>		3
		<b>Units 14</b>
<b>Second 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
CHEM 215	General Chemistry II (Major Lower-Division Core)	4
GE Area A		3
GE Area E		3
		<b>Units 16</b>
<b>Third Semester</b>		
BIOL 240	Introductory Biology II (Major Lower-Division Core) <sup>4</sup>	5
Select One (Major Lower-Division Core): <sup>5</sup>		3
CHEM 130	General Organic Chemistry	
CHEM 233	Organic Chemistry I	
PHYS 111 & PHYS 112	General Physics I and General Physics I Laboratory (Major Lower-Division Core, B1, B3)	4
GE Area D		3
		<b>Units 15</b>

<b>Fourth Semester</b>		
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)		
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory (Major Lower-Division Core)	4
GE Area C - Take Two		6
GE Area D		3
		<b>Units 16</b>

<b>Fifth Semester</b>		
BIOL 355	Genetics (Major Upper-Division Core)	3
BIOL 401 & BIOL 402GW	General Microbiology and General Microbiology Laboratory - GEAR (Major Upper-Division Core)	6
GE Area C		3
GE Area F <sup>±</sup>		3
		<b>Units 15</b>

<b>Sixth Semester</b>		
Select One (Major Upper-Division Core):		3
CHEM 340	Biochemistry I	
CHEM 349	General Biochemistry	
GE Area UD-D: Upper-Division Social Sciences		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
SF State Studies or University Elective - Take Two		6
		<b>Units 15</b>

<b>Seventh Semester</b>		
BIOL 337	Evolution (Major Upper-Division Core)	3
Major Upper-Division Electives (11 Units Total) <sup>6</sup>		6
GE Area UD-C: Upper-Division Arts and/or Humanities		3
SF State Studies or University Elective		3
		<b>Units 15</b>

<b>Eighth Semester</b>		
Major Upper-Division Electives (11 Units Total) <sup>6</sup>		5
SF State Studies or University Elective – Take Three		9
		<b>Units 14</b>
		<b>Total Units 120</b>

<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 GE Area A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

<sup>2</sup> To determine the best B4 course option, students should complete the online advising activity at [mathadvising.sfsu.edu](http://mathadvising.sfsu.edu) (<https://mathadvising.sfsu.edu/>). Questions? Contact Gator Smart Start. (<https://gatorsmartstart.sfsu.edu/>)

<sup>3</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>4</sup> GE Area B2 (Life Science) is satisfied upon completion of BIOL 240.

<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> **Electives in Microbiology**

Select 11 units from the following courses, including at least two laboratory courses. Consult an advisor to select electives that best align with your interests and future career goals. Any course taken as an elective that does not appear on this list will not be counted towards the completion of the Microbiology degree requirements unless it is approved by an advisor prior to enrolling in the course. Students who intend to apply for admission to Clinical Laboratory Science programs after graduation are strongly advised to speak with a Microbiology advisor for help in choosing their elective classes.

BIOL 420 General Virology (3 units)

BIOL 425 Emerging Diseases (3 units)

BIOL 430 Medical Microbiology (3 units)

BIOL 435 Immunology (3 units)

BIOL 442 Microbial Physiology (3 units)

BIOL 446 Microbial Genomics (4 units)

BIOL 453 General Parasitology (3 units)

BIOL 490 Ecology of Infectious Diseases (4 units)

BIOL 638 Bioinformatics and Sequence Analysis (4 units)

BIOL 644 LEADerS Service Learning Course: Learners Engaged in Advocating for Diversity in Science (4 units)

Select two laboratory courses from the following:

BIOL 431 Medical Microbiology Laboratory (2 units)

BIOL 436 Immunology Laboratory (2 units)

BIOL 443 Microbial Physiology Laboratory (2 units)

BIOL 454 Parasitology Laboratory (1 unit)

BIOL 625 Hematology (3 units)

BIOL 699 Independent Study in Biology (1-3 units)

CHEM 343 Biochemistry I Laboratory (3 units)

or CHEM 336 Organic Chemistry II Laboratory (2 units)

± Given catalog rights, fall 2023 transfer students do not need to complete an Area F course.