

BACHELOR OF ARTS IN CHEMISTRY ROADMAP

120 Total Units Required

Minimum Number of Units in the Major: 54

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 (Major Lower-Division)	4
ENG 114	Writing the First Year: Finding Your Voice (A2) ¹	3
MATH 226	Calculus I (Major Lower-Division, B4) ²	4
GE Area A ³		3
		Units
		14
Second Semester		
CHEM 215	General Chemistry II (Major Lower-Division)	4
MATH 227	Calculus II (Major Lower-Division)	4
GE Area A		3
GE Area E		3
		Units
		14
Third Semester		
CHEM 233 & CHEM 234	Organic Chemistry I and Organic Chemistry I Laboratory (Major Lower-Division)	5
CHEM 321 & CHEM 322	Quantitative Chemical Analysis and Quantitative Chemical Analysis Laboratory (Major Upper-Division)	5
GE Area C		3
GE Area D		3
		Units
		16
Fourth Semester		
CHEM 335 & CHEM 336	Organic Chemistry II and Organic Chemistry II Laboratory (Major Upper-Division)	5
Select One Set of Courses (Major Lower-Division, B1, B3): ⁴		4
PHYS 111 & PHYS 112	General Physics I and General Physics I Laboratory	
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory	
GE Area B: Life Science (B2)		3
GE Area D		3
		Units
		15
Fifth Semester		
CHEM 390GW	Contemporary Chemistry and Biochemistry Research - GWAR (Major Upper-Division)	3
Select One Set of Courses (Major Lower-Division): ⁴		4
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	

PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory	
GE Area C - Take Two		6
GE Area F [±]		3
	Units	16
Sixth Semester		
Select One (Major Upper-Division):		3
CHEM 300	Physical Chemistry for Life Sciences I	
CHEM 351	Physical Chemistry I: Thermodynamics and Kinetics	
Select One (Major Upper-Division):		3
CHEM 340	Biochemistry I	
CHEM 349	General Biochemistry	
GE Area UD-C: Upper-Division Arts and/or Humanities		3
U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg)		3
SF State Studies or University Elective ⁵		3
	Units	15
Seventh Semester		
CHEM 325	Inorganic Chemistry (Major Upper-Division)	3
GE Area UD-B: Upper-Division Physical and/or Life Sciences		3
GE Area UD-D: Upper-Division Social Sciences		3
SF State Studies or University Elective - Take Two ⁵		6
	Units	15
Eighth Semester		
Upper-Division Electives ⁶		3
SF State Studies or University Elective - Take Four ⁵		12
	Units	15
	Total Units	120

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

³ 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.

⁴ PHYS 111 and PHYS 112 are prerequisites for PHYS 121 and PHYS 122. PHYS 220 and PHYS 222 are prerequisites for PHYS 240 and PHYS 242.

⁵ **Complementary Studies**

Students in the BA Chemistry program will satisfy the Complementary Studies requirement with the completion of courses in physics and mathematics that are required in the major.

⁶ **Upper-Division Electives**

Students must complete at least 3 **units** of upper-division electives selected from the list below. Courses from community colleges cannot be substituted for the courses on the list below. Consult with an advisor regarding selection of elective courses and check course co- and prerequisites before enrolling. Graduate-level courses in chemistry or appropriate courses in biology, physics, geosciences, and computer science may be substituted upon prior approval of an advisor. Students should keep in mind that non-Chemistry courses may require additional prerequisites that are not met in the Chemistry degree or permission of the instructor.

CHEM 343 Biochemistry I Laboratory (3 units)

CHEM 370 Computer Applications in Chemistry and Biochemistry (3 units)

CHEM 420 Environmental Analysis (3 units)

CHEM 422 Instrumental Analysis (4 units)

CHEM 426 Advanced Inorganic Chemistry Laboratory (2 units)

CHEM 451 Experimental Physical Chemistry Laboratory (2 units)

CHEM 667/BIOL 667 Optical Engineering for the Biological Sciences (3 units)

CHEM 685 Projects in the Teaching of Chemistry and Biochemistry (1 unit)

CHEM 686 Experiences in Teaching Chemistry and Biochemistry (1 unit)⁸

CHEM 699 Independent Study (1-6 units)⁹

Select One:

CSC 306 An Interdisciplinary Approach to Computer Programming (3 units)

CSC 408 Machine Learning and Data Science for Personalized Medicine (3 units)

CSC 509 Data Science and Machine Learning for Medical Image Analysis (3 units)

⁷ For students who pursue a double major in the BA Chemistry and BS Biochemistry programs, CHEM 343 cannot be used to meet the elective requirement for the BA Chemistry. Students must take a different approved elective list to meet this requirement.

⁸ May be repeated and up to 2 units used towards Elective requirement.

⁹ By petition only. Units must be taken in the same semester to be used as an upper division elective.

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