

BACHELOR OF ARTS IN CHEMISTRY ROADMAP – QUANTITATIVE REASONING CATEGORY III/IV AND STRETCH ENGLISH

120 Total Units Required

Minimum Number of Units in the Major: 56

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		
ENG 104	Writing the First Year: Finding Your Voice Stretch I ¹	3
MATH 197	Prelude to Calculus I (Prerequisite for CHEM 115 and MATH 226) ^{2,3}	3
GE Area A ⁴		3
GE Area C		3
GE Area D		3
Units		15
Second Semester		
CHEM 115	General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division)	5
ENG 105	Writing the First Year: Finding Your Voice Stretch II (A2) ¹	3
MATH 198	Prelude to Calculus II (Prerequisite for MATH 226, B4) ^{2,3}	3
GE Area A		3
Units		14
Third Semester		
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)	5
MATH 226	Calculus I (Major Lower-Division, B4) ^{2,3}	4
GE Area B: Life Science (B2)		3
GE Area E		3
Units		15
Fourth 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
MATH 227	Calculus II (Major Lower-Division)	4
Units		14

Fifth Semester

CHEM 335 & CHEM 336	Organic Chemistry II and Organic Chemistry II Laboratory (Major Upper-Division) ⁵	5
Select One Set of Courses (Major Lower-Division, B1, B3): ⁶		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 C		3
GE Area D		3
	Units	15

Sixth Semester

CHEM 390GW	Contemporary Chemistry and Biochemistry Research - GVAR (Major Upper-Division)	3
Select One Set of Courses (Major Lower-Division): ⁶		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		3
GE Area F [±]		3
U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg)		3
	Units	16

Seventh Semester

CHEM 300	Physical Chemistry for Life Sciences I ⁷	3
Select One (Major Upper-Division):		3
CHEM 340	Biochemistry I	
CHEM 349	General Biochemistry	
GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)		3
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	15

Eighth Semester

CHEM 325	Inorganic Chemistry (Major Upper-Division)	3
Upper Division Electives ⁹		3
SF State Studies or University Elective - Take Three ⁸		10
	Units	16
	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 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 the **SF State Studies** (AERM, GP, ES, SJ) requirements within your GE or major.

⁵ CHEM 338 may be substituted for CHEM 336.

- 6 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.
- 7 CHEM 351 may be substituted for CHEM 300 if prerequisites for CHEM 351 are met.
- 8 **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.
Students who have earned AA-T or AS-T degrees and are pursuing a similar B.A. degree at SF State are required to fulfill the Complementary Studies requirement as defined by the major department. Students should consult with a major advisor about how transfer units and/or SF State units can best be applied to this requirement in order to ensure degree completion within 60 units.
- 9 **Upper-Division Electives**
CHEM 343 Biochemistry I Laboratory (3 units)¹⁰
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 685 Projects in the Teaching of Chemistry and Biochemistry (1 unit)¹¹
CHEM 686 Experiences in Teaching Chemistry and Biochemistry (1 unit)¹¹
CHEM 699 Independent Study (1-6 units)¹²
Select One:
CSC 306 An Interdisciplinary Approach to Computer Programming (3 units)
CSC 508 Machine Learning and Data Science for Personalized Medicine (3 units)
CSC 509 Data Science and Machine Learning for Medical Image Analysis (3 units)
- 10 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.
- 11 May be counted only once as an elective.
- 12 By petition only.
- ± Given catalog rights, fall 2022 transfer students do not need to complete an Area F course.