

BACHELOR OF ARTS IN CHEMISTRY ROADMAP

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 | | |
| CHEM 115 | General Chemistry I (Major Lower-Division) | 5 |
| 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 |
| | | 15 |
| Second 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 227 | Calculus II (Major Lower-Division) | 4 |
| GE Area A | | 3 |
| GE Area E | | 3 |
| | | Units |
| | | 15 |
| 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 Three ⁵ | | 10 |
| | Units | 13 |
| | 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)⁸
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 508 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 counted only once as an elective.

⁹ By petition only. To be used as an upper division elective in Chemistry, a minimum of 3-units must be taken in a single semester.

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