

# BACHELOR OF ARTS IN CHEMISTRY ROADMAP - QUANTITATIVE REASONING CATEGORY I/II AND ENG 114

120 Total Units Required

Minimum Number of Units in the Major: 57

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: Essential Concepts of Chemistry (Major Lower-Division)	5
ENG 114	Writing the First Year: Finding Your Voice (A2) <sup>1</sup>	3
GE Area A <sup>2</sup>		3
GE Area D		3
	Units	14
<b>Second Semester</b>		
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) <sup>3</sup>	4
GE Area A		3
GE Area E		3
	Units	15
<b>Third Semester</b>		
CHEM 233 & CHEM 234	Organic Chemistry I and Organic Chemistry I Laboratory (Major Lower-Division)	5
MATH 227	Calculus II (Major Lower-Division)	4
Select One Set of Courses (Major Lower-Division): <sup>4</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		3
	Units	16
<b>Fourth Semester</b>		
Select One Set of Courses (Major Lower-Division): <sup>4</sup>		4
PHYS 121 & PHYS 122	General Physics II and General Physics II Laboratory	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory	
GE Area B: Life Science (B2)		3
GE Area C		3

GE Area D - Take Two		6
	Units	16
<b>Fifth Semester</b>		
CHEM 390GW	Contemporary Chemistry and Biochemistry Research - GVAR (Major Upper-Division)	3
GE Area C		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective - Take Two <sup>5</sup>		6
	Units	15
<b>Sixth Semester</b>		
CHEM 321	Quantitative Chemical Analysis (Major Upper-Division)	3
CHEM 322	Quantitative Chemical Analysis Laboratory (Major Upper-Division)	2
CHEM 335 & CHEM 336	Organic Chemistry II and Organic Chemistry II Laboratory (Major Upper-Division) <sup>6</sup>	5
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
SF State Studies or University Elective <sup>5</sup>		3
	Units	16
<b>Seventh Semester</b>		
CHEM 300	General Physical Chemistry I (Major Upper-Division) <sup>7</sup>	3
CHEM 325	Inorganic Chemistry (Major Upper-Division)	3
CHEM 340 or CHEM 349	Biochemistry I (Major Upper-Division) or General Biochemistry	3
GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective <sup>5</sup>		3
	Units	15
<b>Eighth Semester</b>		
Advanced Laboratory Electives <sup>8</sup>		3
SF State Studies or University Elective - Take Three <sup>5</sup>		10
	Units	13
	Total Units	120

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

<sup>3</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>4</sup> 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.

<sup>5</sup> **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.

<sup>6</sup> CHEM 338 may be substituted for CHEM 336.

<sup>7</sup> CHEM 351 may be substituted for CHEM 300 if prerequisites for CHEM 351 are met.

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**Advanced Laboratory Electives**

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 699 Independent Study (1-6 units)