

# BACHELOR OF ARTS IN CHEMISTRY – CHEM ASSOCIATE DEGREE FOR TRANSFER (ADT) ROADMAP

This is a sample pathway for students who transfer to San Francisco State University in the current Bulletin year with an AS-T in Chemistry. Thirty-four units in the major (CHEM 115/CHEM 215, CHEM 233/CHEM 234, CHEM 335/CHEM 336, MATH 226/MATH 227, required PHYS sequence) and 33 units of lower-division GE have been satisfied. Check with a major advisor about the most appropriate course sequence for you. **Degree completion guaranteed in 60 units; see the Associate Degree for Transfer (ADT) section for more information (<http://bulletin.sfsu.edu/undergraduate-admissions/transfer-students/>).**

## To Do at SF State:

Enough total units to reach 120 minimum for graduation; 30 units minimum at the upper-division level; to include the following:

### University-Wide Requirements: 15-21 Units

- American Institutions (0-6 units): US History, US Government, California State and Local Government requirements if not taken before transfer.
- Lower-division GE (6 units) – Area C (3 units in any subarea) and Area D (3 units).
- Upper-division GE, Areas B, C, and D (9 units) - Courses required for the major may double-count if approved for UD GE.
- Students entering this major with the AS-T in Chemistry are not required to fulfill SF State Studies requirements.
- Complementary Studies is met in major with required PHYS and MATH courses.

### Chemistry B.A.: 20-23 Units

Completed: CHEM 115/CHEM 215, CHEM 233/CHEM 234, CHEM 335/CHEM 336, MATH 226/MATH 227, required PHYS sequence.

- Major Upper-Division Requirements/GWAR (17-20 units)
- Major Upper-Division Electives (3 units) - Consult with an advisor regarding the selection of elective courses and check course co- and prerequisites before enrolling.

### University Electives: 19 or More Units

Depending on course choices made at the community college, how transferred units are applied to the requirements above, and course choices at SF State. Some courses may meet more than one requirement, e.g., UD GE and the major. Upper-division electives are recommended to meet the minimum 30-unit upper-division requirement.

Course	Title	Units
<b>First Semester</b>		
CHEM 321 & CHEM 322	Quantitative Chemical Analysis and Quantitative Chemical Analysis Laboratory (Major Upper-Division)	5
CHEM 390GW	Contemporary Chemistry and Biochemistry Research - GWAR (Major Upper-Division)	3
US History ( <a href="http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#USHaGR">http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#USHaGR</a> ) or University Elective if US History complete		3
University Elective		4
	<b>Units</b>	<b>15</b>
<b>Second Semester</b>		
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 C		3
GE Area D		3
GE Area UD-B: Upper-Division Physical and/or Life Sciences		3
	<b>Units</b>	<b>15</b>
<b>Third Semester</b>		
CHEM 325	Inorganic Chemistry (Major Upper-Division)	3
GE Area UD-C: Upper-Division Arts and/or Humanities		3
University Elective - Take Three		9
	<b>Units</b>	<b>15</b>
<b>Fourth Semester</b>		
Upper Division Electives <sup>1</sup>		3
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
or University Elective if US/CA Government met before transfer		
University Elective – Take Two		6
	<b>Units</b>	<b>15</b>
	<b>Total Units</b>	<b>60</b>

<sup>1</sup> **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)<sup>2</sup>

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)<sup>3</sup>

CHEM 699 Independent Study (1-6 units)<sup>4</sup>

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)

<sup>2</sup> 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.

<sup>3</sup> May be repeated and up to 2 units used towards Elective requirement.

<sup>4</sup> By petition only. Units must be taken in the same semester to be used as an upper division elective.