

# MASTER OF SCIENCE IN CHEMISTRY: CONCENTRATION IN BIOCHEMISTRY

## Admission to Program

Students must meet these criteria:

- Satisfy the University's admission requirements.
- Have completed a BS or BA in chemistry, biochemistry, or a related field such as molecular biology, chemical engineering, materials science, or physics. Please note that some graduate courses assume the enrolled students have completed a year of physical chemistry and/or a semester of biochemistry. Additional coursework may be required for non-chemistry or biochemistry applicants.
- Have a GPA of at least 3.0 in chemistry and related courses.
- Applicants are required to fill out the department application form. Department application procedures are described at <https://chemistry.sfsu.edu/graduate> (<https://chemistry.sfsu.edu/graduate/>).
- Submit three letters of recommendation from individuals familiar with previous academic work and/or potential for graduate work in chemistry. These letters should be sent through CalApply.

## Program Learning Outcomes

1. Demonstrate in-depth knowledge in a subdiscipline of chemistry.
2. Organize and communicate scientific information clearly and concisely, both verbally and in writing.
3. Use the scientific literature to develop and implement a research project.
4. Demonstrate independence in designing and conducting experiments, analyzing data, and interpreting results.
5. Keep accurate records of experiments and data.
6. Demonstrate an ability to engage in collaborative scientific activities in research and coursework.

## Written English Proficiency Requirement

### Level One

The Level One writing requirement is satisfied by completing CHEM 879.

### Level Two

The Level Two writing requirement is satisfied by successfully completing CHEM 880, a thesis (CHEM 898) or written manuscript (CHEM 895), and an oral defense of the research project.

## Advancement to Candidacy

To advance to candidacy, students must:

- Pass any three of the American Chemical Society (ACS) graduate entrance examinations: analytical, biochemistry, inorganic, organic, or physical chemistry. These examinations cover mainly undergraduate-level material.
- Satisfy Level One of the written English proficiency requirement.
- Satisfy all course deficiencies stipulated upon entrance into the program.
- File an Advancement to Candidacy (ATC) form.

**Note:** After initiating a research project, a graduate student must enroll each semester in CHEM 897 while actively engaged in research for the M.S. degree. A maximum of 9 units of CHEM 897 may be included in the Advancement to Candidacy.

## Chemistry (M.S.): Concentration Biochemistry – 30-33 units

### Program (6 units)

Code	Title	Units
CHEM 879	Research Methods I	3
CHEM 880	Research Methods II	3

### Research Requirements (9-12 units)

Research project in biochemistry, bioorganic, bioanalytical, biophysical, bioinorganic, biomedical, or biochemical education subdiscipline required.

Code	Title	Units
CHEM 897	Research	1-3

### Culminating Experience (3 units)

One of the following Culminating Experience courses selected with prior consultation with the Culminating Experience committee:

Code	Title	Units
CHEM 898	Master's Thesis	3
or CHEM 895	Research Project	
	Oral Defense of Culminating Experience	

### Related Study (9-12 units)

Graduate courses in biochemistry, chemistry, physics, mathematics, or biology on advisement of a graduate major advisor. Upper-division courses may be used with permission of a graduate major advisor.

Code	Title	Units
<b>Analytical/Environmental/Methods (AEM)</b>		
CHEM 741	Electron Microscopy	4
CHEM 800	Special Topics in Chemistry (X-Ray Techniques)	3
CHEM 820	NMR Applications and Techniques	3
CHEM 821	Mass Spectrometry - Principles and Practice	3
<b>Biochemistry (BIO)</b>		
CHEM 800	Special Topics in Chemistry (Proteomics)	3
CHEM 800	Special Topics in Chemistry (Enzymology)	3
CHEM 841	Enzymology	3
CHEM 851	Biochemical Spectroscopy	3
<b>Organic/Medicinal (OM)</b>		
CHEM 800	Special Topics in Chemistry (Natural Products)	3
CHEM 800	Special Topics in Chemistry (Adv. Org. Chem. - Molec. Struct. & Reactivity)	3
CHEM 832	Organic Synthesis	3
CHEM 834	Organic Spectroscopic Methods	3
CHEM 842	Bioorganic and Medicinal Chemistry	3
<b>Physical/Inorganic/Computational (PIC)</b>		
CHEM 851	Biochemical Spectroscopy	3
CHEM 800	Special Topics in Chemistry	3

CHEM 852	Statistical Mechanics: Molecular Relaxation	3
CHEM 870	Computational Methods in Chemistry	3
<b>Chemical Education</b>		
CHEM 885	Teaching College Chemistry	3