

# MS IN CHEMISTRY (BIOCHEMISTRY)



## SACRAMENTO STATE

### In Workflow

1. CHEM Committee Chair (robertslm@csus.edu)
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### Approval Path

1. Thu, 12 Sep 2024 22:26:34 GMT  
Linda Roberts (robertslm): Approved for CHEM Committee Chair
2. Fri, 25 Oct 2024 16:21:37 GMT  
Thomas Savage (tjsavage): Approved for CHEM Chair
3. Thu, 07 Nov 2024 01:27:18 GMT  
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Mon, 18 Nov 2024 16:17:04 GMT  
Chris Taylor (ctaylor): Approved for NSM Dean

### History

1. May 1, 2018 by clmig-jwehrheim
2. Jan 30, 2020 by Benjamin Gherman (ghermanb)
3. Mar 11, 2021 by Benjamin Gherman (ghermanb)
4. Sep 11, 2023 by Benjamin Gherman (ghermanb)

Date Submitted: Mon, 02 Sep 2024 23:46:46 GMT

### Viewing: MS in Chemistry (Biochemistry)

**Last approved: Mon, 11 Sep 2023 15:56:38 GMT**

**Last edit: Thu, 07 Nov 2024 01:27:07 GMT**

Changes proposed by: Benjamin Gherman (102085943)

#### Academic Group: (College)

Natural Sciences & Mathematics

#### Academic Organization: (Department)

Chemistry

#### Catalog Year Effective:

2025-2026 Catalog

**Individual(s) primarily responsible for drafting the proposed degree major program:**

Name (First Last)	Email	Phone 999-999-9999
Benjamin Gherman	ghermanb@csus.edu	916-278-6600

**Type of Program:**

Major

**Program Change Type:**

Non-Substantive

**Delivery Format:**

Fully Face to Face

**Title of the Program:**

MS in Chemistry (Biochemistry)

**Designation: (degree terminology)**

Master of Science

**Briefly describe the program proposal (new or change) and provide a justification:**

- 1) Update elective list to include Chem 267, a newly created course on the biochemistry of aging.
- 2) Update the admission requirements to remove mention of the last 60 units GPA. The department has not included this requirement in its admission criteria reported to the Office of Graduate Studies for at least several years. We are therefore updating the catalog page to match the criteria actually being used for admission to the graduate program.
- 3) Within admission procedures, providing additional direction to applicants with regards to submitting optimal letters of recommendation and personal statements.

**University Learning Goals****Graduate (Masters) Learning Goals:**

Disciplinary knowledge  
 Communication  
 Critical thinking/analysis  
 Information literacy  
 Professionalism  
 Research (optional)

**Program Learning Outcomes****Program Learning Outcomes****Learning Outcome**

- Student demonstrates ability to describe and apply biochemistry and chemistry knowledge and skills.
- Student demonstrates oral and written communication skills related to presenting contemporary scientific research in chemistry, including goals, background, methods, data, and conclusions.
- Student demonstrates ability to analyze original research data and to synthesize results and conclusions with regard to the relevant biochemistry and chemistry research literature.
- Student demonstrates ability to obtain and evaluate information from a variety of scientific sources. Student demonstrates knowledge of different forms of plagiarism and how to avoid these.
- Student demonstrates knowledge of safety practices and handling and disposal of hazardous materials in the area of the thesis research.

**Learning Outcomes Display**

Course Code	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
CHEM 200					
CHEM 260					
CHEM 261					
CHEM 294					
CHEM 220					
CHEM 226					
CHEM 230					

CHEM 245					
CHEM 250					
CHEM 251					
CHEM 252					
CHEM 253					
CHEM 254					
CHEM 255					
CHEM 267					
CHEM 299					
CHEM 500					

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

#### Catalog Description:

Total units required for MS: 30

## Program Description

The graduate programs in the Department of Chemistry provide students with advanced study in synthesis, separation, and analysis of molecules with an emphasis on developing research skills in experimental and computational chemistry and in chemistry education. The graduate curriculum prepares students for careers in industry and teaching and for entry into PhD and professional programs.

**Admission Requirements: Course prerequisites and other criteria for admission of students to the degree major program, and for their continuation in it.**

## Admission Requirements

Admission as a classified graduate student in the Department of Chemistry requires:

- a BA or BS degree in chemistry, biochemistry or its equivalent as determined by the graduate committee;
- a minimum 2.5 GPA overall, and minimum 2.5 GPA in chemistry, biochemistry, math, biology, and physics courses

Students desiring to apply to the chemistry graduate program should first examine the chemistry department's web page for basic requirements and deadlines and then contact the Chemistry department graduate coordinator or department Chair for further information if needed. International students should also contact the Office of International Programs and Global Engagement for specific application requirements for international applicants.

### Admission Procedures

Students desiring to apply to the chemistry graduate program should first contact the Chemistry Department Graduate Coordinator or Department Chair. Information about the graduate program will be discussed with you.

Applicants must complete a Cal State Apply application by the posted deadline for the term applying. For more admissions information and application deadlines, please visit <http://www.csus.edu/graduate-studies/>. The university application requires:

- submission of the Cal State Apply application;
- two letters of recommendation from persons qualified to judge the applicant's potential for successful graduate study and research; letters ideally will come from a faculty member in chemistry, biochemistry, or related field;
- a personal statement describing the applicant's motivation for seeking a master's degree, why the Sacramento State Chemistry department was selected for pursuing this degree, and the area of advanced study within chemistry, biochemistry or education research on which the applicant plans to focus (including potentially identifying up to three faculty members of interest); and
- one set of **official transcripts from all colleges and universities attended**, other than Sacramento State.

Approximately six weeks after the admission application deadline, an admission decision will be transmitted electronically to the applicant.

### Proficiency Examinations

All new graduate students must take two proficiency exams, in organic and physical chemistry, administered at the beginning of each semester. These exams cover topics commonly found in undergraduate courses. A passing score on either exam is a score of 50% or higher. Exam results are used to determine undergraduate deficiencies in these areas of chemistry. All deficiencies must be removed by either taking and passing with a grade of "B-" (i.e., B minus) an appropriate undergraduate course or by taking again and passing

the proficiency exam. A proficiency exam can be taken only twice; if the exam is not passed after the second attempt, the appropriate undergraduate course must be completed with a minimum grade of "B-" (i.e., B minus) in the first attempt.

## Course Requirements

The program centers on three core courses and four semesters of seminar designed to increase a student's knowledge and skills in applications of analytical techniques, general instrumentation techniques, chemical separation techniques, and analysis of spectra. Electives are offered to permit students to expand further their knowledge and skills in chemistry. While a minimum overall and semester GPA of 3.00 must be maintained to sustain good standing in the graduate program, the Department of Chemistry will allow grades of B-, C+ or C to count towards the MS degree for the following, as long as an overall GPA of 3.0 is maintained:

- One core course of the MS Chemistry or MS Chemistry (Biochemistry)
- One to two elective courses for either degree path
- The student cannot exceed six units of completed work at a grade below a B and have it count towards the MS degree

NOTE: A grade of B or better is REQUIRED for Chem 200 (Research Methods in Chemistry) as this Graduate Writing Intensive (GWI) class counts towards the Graduate Writing Assessment Requirement (GWAR) as per University Policy.

Students not meeting these requirements are subject to probationary status and potential disqualification from the program. In addition, students must regularly attend seminars offered approximately once a week each semester. Each student will give one seminar during his/her tenure as a graduate student that is on a literature topic not related to his/her thesis topic and another on his/her thesis results. Participation in seminar expands a student's knowledge of current research in chemistry and also assists in developing his/her oral presentation skills.

## Thesis/Research

All students are required to complete a thesis involving original research. The research may be conducted on campus with a chemistry faculty member or at an employer's work site providing the work involves producing a new contribution to the field of chemistry. Research conducted at a work site requires a supervising chemistry faculty member. The work site mentor and project must be approved by the Graduate Committee.

## Advising

Following admission to the chemistry graduate program, students are advised by the graduate coordinator and by the faculty thesis supervisor. Students should consult with three faculty members before deciding on a thesis advisor. Students who are fully qualified upon admission and make the expected progress can finish the degree in two years.

## Financial Aid

Financial aid is available. Please contact the Financial Aid and Scholarships Office for more information (1006 Lassen Hall, <https://www.csus.edu/apply/financial-aid-scholarships/>).

## Employment

Qualified graduate students may be hired for a limited number of positions as teaching associates (TA), instructional student assistants (ISA), or graduate assistants (GA). TAs teach undergraduate chemistry laboratories and discussions. ISAs assist instructors in upper division laboratory courses. GAs typically work in the chemistry stockrooms. Eligibility requirements include: classified status, minimum cumulative GPA 3.0, good English communication skills, passing score on a general chemistry examination (TA only). Continuing students desiring support as a TA/ISA/GA will be evaluated on the basis of past performance as a TA/ISA/GA and academic record as a graduate student in the program. Contact the Department Chair for current employment information.

## Safety

Due to the potential hazards some chemicals may present, safety is an essential element of all Chemistry laboratory classes, including independent research. All students must adhere to the Department of Chemistry Laboratory Safety Policies (<https://www.csus.edu/college/natural-sciences-mathematics/internal/safety/>). Failure to adhere to the Safety Policies may constitute grounds for withdrawal from a course and/or dismissal from the graduate program.

## Laboratory Fees

Students enrolling in chemistry laboratory courses or supervisory courses involving laboratory research are required to pay a laboratory fee for each course. In addition, if a student breaks an item in a laboratory, s/he is required to replace it or pay a breakage cost. An administrative hold is placed on a student's academic record if either is not paid. Details are given at the first class meeting.

## Repeating a Chemistry Course

Students repeating a chemistry course must repeat an equivalent course in both units and content. An approved Course Repeat Petition is required prior to enrolling in the repeated course.

## Minimum Units and Grade Requirement for the Degree

Units required for the MS: 30

Minimum Cumulative GPA: 3.0

## Advancement to Candidacy

After completing at least 40 percent of the graduate degree coursework with an overall GPA of 3.0 or higher, a student may submit an application for Advancement to Candidacy, which indicates the proposed program of graduate study is acceptable to the student, faculty advisor, thesis committee, and the Chemistry graduate coordinator. This procedure may begin as soon as the classified graduate student has:

- removed any deficiencies in admission requirements
- met English proficiency requirements
- completed at least 12 units of 200-level courses ( including CHEM 200) with a minimum 3.0 GPA
- taken a Graduate Writing Intensive (GWI) course in the discipline within the first two semesters of coursework at California State University, Sacramento
- successfully completed Chem 200 with a grade of B or better
- obtained approval of the thesis project by the thesis advisor and thesis committee. Students obtain thesis project approval through submission of a formal thesis project proposal and an oral presentation of the project to the thesis committee.
- successfully completed a literature seminar presentation

Note: If a student wishes to advance to candidacy with an incomplete literature seminar or thesis proposal defense, the following conditions must be met:


- The graduate coordinator must be notified in advance of the OGS deadline of their intent to file for advancement to candidacy and inform the graduate coordinator which departmental requirement (literature seminar or thesis proposal defense) is incomplete. The graduate coordinator will then consult the student's thesis proposal advisor for information regarding the following:
- For the literature seminar, the student abstract must be fully approved by the Graduate Committee, and a date must be scheduled for the seminar in the same semester as the advance to candidacy paperwork is submitted to OGS.
- For the thesis proposal, the graduate coordinator will consult the student's thesis advisor to confirm that the written thesis proposal is ready for distribution to the student's full committee and that a date has been set for the thesis proposal defense in the same semester as the advance to candidacy paperwork is submitted to OGS.

Failure of the student to successfully complete either the literature seminar *or* the thesis proposal defense will result in the student not being able to sign up for Chem 500 (Culminating Experience) until the requirement is successfully completed.

As defined by policy <http://www.csus.edu/umannual/acadaff/fsm00010.htm>, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

**Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)**

## Program Requirements

Code	Title	Units
<b>Required Courses (11 Units)</b>		
CHEM 200	Research Methods in Chemistry 	3
CHEM 260	Protein Biochemistry	3
CHEM 261	Nucleic Acid Chemistry	3
<i>Seminar in Chemistry - Semester 1</i>		
CHEM 294	Seminar In Chemistry	0.5
<i>Seminar in Chemistry - Semester 2</i>		
CHEM 294	Seminar In Chemistry	0.5
<i>Seminar in Chemistry - Semester 3</i>		
CHEM 294	Seminar In Chemistry	0.5
<i>Seminar in Chemistry - Semester 4</i>		
CHEM 294	Seminar In Chemistry	0.5
<b>Electives (9 Units)</b>		
Select 9 units from the following: <sup>1</sup>		9
CHEM 220	Spectrometric Identification of Compounds	
CHEM 226	Physical Organic Chemistry	
CHEM 230	Separation Methods in Chemistry	
CHEM 245	Applications of Computational Chemistry	
CHEM 250	Selected Topics in Chemistry	
CHEM 251	Topics in Interdisciplinary Chemistry	
CHEM 252	Topics in Synthetic Chemistry	
CHEM 253	Topics in Applied Chemistry	
CHEM 254	Topics in Physical Chemistry	
CHEM 255	Topics in Chemistry Education	
CHEM 267	Biochemistry of Aging	
<b>Completion Requirements (10 Units)</b>		
CHEM 299	Special Problems	6
CHEM 500	Culminating Experience	4
<b>Total Units</b>		<b>30</b>

- <sup>1</sup> Graduate or upper division courses in appropriate areas (such as BIO, GEOL, PHYS, ENVS) may be used upon graduate advisor and department chair approval. A maximum of 2 units of upper division undergraduate coursework may be used toward fulfilling electives.

**For graduate programs, the number of declared undergraduate major and the degree production over the preceding years of the corresponding baccalaureate program:**

n/a

### **Fiscal Impact to Change an Existing Program**

**Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:**

None.

**Provide a fiscal analysis of the proposed changes:**

None.

**How will the above changes be accommodated within the department/College existing fiscal resources?**

None.

**Will the proposed changes require additional resources?**

No

**What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?**

None.

Key: 308