

B.S./M.S., CHEMISTRY

Accelerated B.S./M.S. Degrees

The Chemistry BS/MS program with thesis or project prepares students for employment as research chemists in federal, state, municipal, academic or industrial laboratories, and in pre-medicine as laboratory technicians, industry supervisors and technical sales personnel. Graduates also find positions in the environmental sciences, oceanography and related interdisciplinary fields. Many chemistry graduates elect to pursue advanced PhD, pharmacology or MD degrees. The BS/MS program will assist students in successfully preparing for post-graduate programs by helping students follow a curriculum specifically needed for developing successful licensing school applications or scientific careers while enhancing their critical thinking skill sets, scientific knowledge, writing and presentation skill, and to be overall well-rounded professionals.

The Chemistry BS/MS program is designed to assist students in earning both BS and MS degrees quicker and with less cost than earning the degrees individually. This is accomplished by having 12 credits of 400 and 600-level courses count as electives in both degrees. Additionally, in the program, students begin to conduct research in a research laboratory at the beginning of their third year. This early research start will allow students to develop technical laboratory skills and to become familiar with their potential MS project early on in their program.

To complete the MS portion of this program, students will complete a research thesis or a project, in addition to the coursework. This will allow students to tailor their graduate studies to meet their interests and prospective career needs. Students pursuing an MS with a research thesis will conduct laboratory research and produce a thesis generally equivalent to a manuscript for a peer-reviewed journal. Students pursuing an MS with a project will conduct a research project that may be based solely or partly in literature review/synthesis. This can include writing a review article or a different activity as decided by the student's committee. To ensure the success of students in this program, students will need to be advised very carefully by their faculty advisor and committee.

Minimum Requirements for Accelerated Mathematics B.S./M.S. Degrees: 138 credits

Learn more about the bachelor's degree in chemistry (<https://uaf.edu/academics/programs/bachelors/chemistry.php>), including an overview of the program, career opportunities and more.

College of Natural Science and Mathematics
Department of Chemistry and Biochemistry (<https://www.uaf.edu/chem/>)
907-474-5510

Admission Requirements

BS Applicants must complete the following admission requirements:

- Be admitted to the Chemistry baccalaureate program and have at least junior standing;
- Have a 3.0 GPA, and have completed 24 of their undergraduate major requirements;
- Submit a study goal statement;

- Submit a UAF graduate application for admission.

Program Requirements

Students must earn a C- or better in all the below courses

Minimum Requirements for Chemistry B.S./M.S. Degree: 138 credits*

*Some concentrations may require greater than 138 credits.

CONCENTRATIONS: CHEMISTRY (P. 2), BIOCHEMISTRY AND NEUROSCIENCE (P. 2), ENVIRONMENTAL CHEMISTRY (P. 2)

Code	Title	Credits
General University Requirements		
Complete the general university requirements. (http://catalog.uaf.edu/bachelors/)		
General Education Requirements ¹		
Complete the general education requirements. (http://catalog.uaf.edu/bachelors/general-education-requirements/)		
As part of the general education requirements, complete:		
MATH F251X	Calculus I	4
PHYS F123X and PHYS F124X	College Physics I and College Physics II	8
or PHYS F211X and PHYS F212X	General Physics I and General Physics II	
BS Degree Requirements ¹		
Complete the B.S. degree requirements. (http://catalog.uaf.edu/bachelors/summary-of-bachelors-degree-reqs/#bachelorofsciencetext)		
As part of the B.S. requirements, complete:		
MATH F252X	Calculus II	
Chemistry Program Requirements ¹		
CHEM F105X and CHEM F105L	General Chemistry I and Chemistry F105X Lab	4
CHEM F106X and CHEM F106L	General Chemistry II and Chemistry F106X Lab	4
CHEM F202	Basic Inorganic Chemistry	3
CHEM F212	Chemical Equilibrium and Analysis	4
CHEM F321	Organic Chemistry I	4
CHEM F325	Organic Chemistry II	4
CHEM F331	Physical Chemistry I	4
CHEM F332	Physical Chemistry II	4
CHEM F351	General Biochemistry: Metabolism	3
CHEM F434	Chemistry Capstone Laboratory	3
CHEM F481	Seminar	1
CHEM F482	Seminar	2
As part of the ACS-certification, complete:		
MATH F253X	Calculus III	4
Complete one from the following concentrations		9-24
Chemistry		
Biochemistry and Neuroscience		
Environmental Chemistry		

¹ Students must earn a C- or better.

CONCENTRATIONS

Chemistry

Code	Title	Credits
Complete one of the following options: 3-5		
CHEM F488	Undergraduate Chemistry and Biochemistry Research (3-4 credits)	
or		
CHEM F288	Introduction to Chemical Research (2 credits)	
CHEM F488	Undergraduate Chemistry and Biochemistry Research (2-3 credits)	
Complete two of the following: 6		
CHEM F314	Analytical Instrumental Laboratory	
CHEM F402	Inorganic Chemistry	
CHEM F450	Information Storage and Transfer: Molecules and Pathways	

Biochemistry and Neuroscience

Code	Title	Credits
Biochemistry and Neuroscience Concentration Requirements		
BIOL F115X and BIOL F115L	Fundamentals of Biology I and BIOL F115X Laboratory	4
BIOL F116X and BIOL F116L	Fundamentals of Biology II and BIOL F116X Laboratory	4
CHEM F450	Information Storage and Transfer: Molecules and Pathways	3
CHEM F488	Undergraduate Chemistry and Biochemistry Research	3
Complete 10 credits from the following: ² 10		
BIOL F240	Beginnings in Microbiology	
BIOL F260 and F260L	Principles of Genetics and BIOL F260 Laboratory	
BIOL F310 and F310L	Animal Physiology and BIOL F310 Laboratory	
BIOL F342 and F342L	Microbiology and BIOL F342 Laboratory	
BIOL F402	Biomedical and Research Ethics	
BIOL F417	Neurobiology	
BIOL F462	Infectious Diseases	
BIOL F465	Immunology	
CHEM F360	Cell and Molecular Biology	
CHEM F455	Environmental Toxicology	
CHEM F470	Cellular and Molecular Neuroscience	
CHEM F474	Neurochemistry	

² Courses selected under these areas must meet baccalaureate degree requirements for 39 upper-division credits.

Environmental Chemistry

Code	Title	Credits
Complete the following:		
CHEM F314	Analytical Instrumental Laboratory	3

CHEM F488	Undergraduate Chemistry and Biochemistry Research	3
Complete two from the following:		6-8
ATM F401	Introduction to Atmospheric Sciences	
BIOL F240	Beginnings in Microbiology	
BIOL F342	Microbiology	
BIOL F457	Environmental Microbiology	
GEOS F417	Introduction to Geochemistry	
NRM F380	Soils and the Environment	

MS portion of the Chemistry BS/MS program with Thesis or Project Requirements

CONCENTRATIONS: BIOCHEMISTRY AND NEUROSCIENCE (p. 3), ENVIRONMENTAL CHEMISTRY (p. 3)

Code	Title	Credits
General University Requirements		
Complete the general university requirements. (http://catalog.uaf.edu/graduate/mastersdegrees/#generaluniversityrequirements)		
Master's Degree Requirements		
Complete the master's degree requirements. (http://catalog.uaf.edu/graduate/mastersdegrees/#masterofsciencewithproject)		
As part of the master's degree requirements complete:		
Oral and Written Comprehensive Exam		
Chemistry Program Requirements		
Complete any deficiencies concurrently with this degree.		
Complete two credits of advisory committee-approved seminar courses from the two seminar course choices below.		2
CHEM F691	Research Presentation Techniques	
CHEM F688	Biochemical and Molecular Biology Seminar	
Complete 6-9 credits from relevant advisory-committee approved graduate-level courses or select one of the following concentrations		6-9
Biochemistry and Neuroscience		
Environmental Chemistry		
Complete 7-10 credits of courses approved by the advisory committee.		7-10
Thesis or Project Requirements		12
Complete the thesis or project option as described below. ^{4,5}		

THESIS OR PROJECT OPTIONS

Thesis Option

Code	Title	Credits
CHEM F699	Thesis	6
Thesis credits or committee-approved courses that are F400-level or higher. ^{4,6}		6
Submit a committee-approved, written research-based thesis proposal and pass an oral comprehensive examination centered on the proposal.		

Complete a committee-approved, research-based written thesis and pass an oral defense of the thesis.

Project Option

Code	Title	Credits
CHEM F698	Non-thesis Research/Project	6
Committee-approved courses that are F400-level or higher. ^{4,6}		6

Submit a committee-approved, literature-based written project proposal and pass an oral comprehensive examination centered on the proposal.

Complete a committee-approved, literature-based written project and pass an oral defense of the project.

- ³ Students in the Biochemistry and Neuroscience concentration should take Biochemical and Molecular Biology Seminar and students in Environmental Chemistry concentration should take Research Presentation Techniques.
- ⁴ The minimum credits required is 30. The required M.S. coursework above represents 18 credits. The minimum number of thesis credits required is 6. For the thesis option the remaining 6 credits can either be thesis credits or courses at the F400-level or higher. For the project option, the remaining 6 credits can be courses at the F400-level or higher.
- ⁵ No more than 12 cr thesis (CHEM F699) and no more than 6 cr project (CHEM F698)
- ⁶ Six (6) 400-level credits earned during the B.S. portion of the program count towards the MS.

CONCENTRATIONS

Biochemistry and Neuroscience

Code	Title	Credits
Complete 9 credits from the following:		9
CHEM F654	Protein Structure and Function	
CHEM F657	Molecular Foundations of Gene Expression	
CHEM F670	Cellular and Molecular Neuroscience	
CHEM F674	Membrane Biochemistry and Biophysics	
CHEM F675	Cellular Signaling	

Environmental Chemistry

Code	Title	Credits
Complete 6 credits from the following:		6
CHEM F606	Atmospheric Chemistry	
CHEM F609	Aquatic and Environmental Geochemistry	
CHEM F631	Environmental Fate and Transport	
CHEM F655	Environmental Toxicology	

See Biochemistry and Neuroscience (<http://catalog.uaf.edu/graduate/graduate-degree-programs/biochemistry-neuroscience/>)

See Environmental Chemistry (<http://catalog.uaf.edu/graduate/graduate-degree-programs/environmental-chemistry/>)