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

B.A., B.S. Degrees
Minimum Requirements for Degrees: 130 credits

Graduates qualify for employment as teachers of chemistry; supervisors in industry; technical sales personnel; research chemists in federal, state, municipal, academic or industrial laboratories; in pre-medicine; and as laboratory technicians. Graduates also find positions in the environmental sciences, oceanography and related interdisciplinary fields. Many chemistry graduates elect to pursue advanced M.S., Ph.D., pharmacology or M.D. degrees.

The chemistry curriculum meets the American Chemical Society (ACS) standards of introducing the basics of general, organic, inorganic, physical, analytical and biochemistry. Undergraduate research leading to publications is strongly encouraged and many of the laboratory-based courses have a research component built into them. There are also options for an ACS-accredited degree which provides students additional exposure to environmental chemistry, biochemistry or forensic (juristic) chemistry. Limited teaching assistantships are often available for upper division students, which strengthens leadership and communication skills.

The chemistry and biochemistry department is housed in the Natural Sciences Facility, which is equipped with research-grade instrumentation, including high field nuclear magnetic resonance (NMR) spectrometer, FT Infrared spectrometers, atomic absorption spectrometer, UV-VIS diode array spectrometers, two gas chromatographs interfaced with mass spectrometers, a gas chromatograph with a flame ionization detector, high performance liquid chromatograph (HPLC), capillary electrophoresis and a modern glove box for handling air sensitive chemicals. Equipment for specialized X-ray diffractometry, electron microscopy, liquid scintillation counting, atomic force-field microscopy, dynamic light scattering analyses, etc. is available in cooperation with other UAF departments and institutes. Two computer laboratories equipped with modern chemical software (HyperChem, ACD Labs, ChemDraw, Chem Sketch, Mestrec) and other software such as Word, Excel, PowerPoint and EndNote are available for all students enrolled in 200-level or above courses.

Major—B.A. Degree
1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, complete: MATH 200X; PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)
2. Complete the B.A. degree requirements. (See page 111. As part of the B.A. degree requirements, complete: MATH 201X.)
4. Complete the following: MATH 202X—Calculus ........................... 4
5. Minimum credits required ................................................................ 130

* Student must earn a C grade or better in each course.

Major—B.S. Degree
1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, complete: MATH 200X; PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)
2. Complete the B.S. degree requirements. (See page 114. As part of the B.S. degree requirements, complete: MATH 201X. Chemistry foundation courses may be used toward partial fulfillment of the natural science requirement.)
3. Complete the program (major) requirements as listed under Chemistry—B.A. Degree.
4. Complete the following:* CHEM 402—Inorganic Chemistry** .................................................. 3 CHEM 451—General Biochemistry .............................................. 3 CHEM 488—Undergraduate Chemistry and Biochemistry Research** 4
5. Minimum credits required ......................................................... 130

* Student must earn a C grade or better in each course.
** Advanced courses in the physical or biological sciences or mathematics may be substituted with permission of the head of the chemistry and biochemistry department. However, the student will not receive an ACS-certified degree.

Note: Upon completing the recommended curriculum and fulfilling all general university requirements, the student will receive a baccalaureate degree certified by the American Chemical Society.

Note: The electives must include at least 6 credits at the upper-division level (to satisfy the UAF general degree requirements or 39 upper-division.)

Concentrations: Biochemistry/Molecular Biology, Environmental Chemistry, Juristic Chemistry

Biochemistry/Molecular Biology
1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, complete: MATH 200X; PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)
2. Complete the B.S. degree requirements. (See page 114. As part of the B.S. degree requirements, complete: MATH 201X. Chemistry foundation courses may be used toward partial fulfillment of the natural science requirement.)
3. Complete the following program (major) requirements:*  
   BIOL 105X—Fundamentals of Biology I  
   BIOL 106X—Fundamentals of Biology II  
   BIOL 342—Microbiology (4)  
   CHEM 105X—General Chemistry  
   CHEM 106X—General Chemistry  
   CHEM 212—Chemical Equilibrium and Analysis  
   CHEM 313—Chemical Analysis of Dynamic Systems  
   CHEM 321—Organic Chemistry  
   CHEM 322—Organic Chemistry  
   CHEM 324W—Organic Laboratory  
   CHEM 331—Physical Chemistry  
   CHEM 332—Physical Chemistry  
   CHEM 413W—Analytical Instrumental Laboratory** (3)  
   CHEM 434W—Instrumental Methods in Physical Chemistry (3)  
   CHEM 451—General Biochemistry  
   CHEM 452W—Biochemistry Laboratory (3)  
   CHEM 456—Advanced Biochemistry  
   CHEM 481—Seminar  
   CHEM 482O—Seminar  
   Major elective (approved by department head)***  

4. Complete the following:  
   MATH 202X—Calculus  

5. Minimum credits required .....................................................130  
   * Student must earn a C grade or better in each course.  
   ** Requires CHEM 412 as prerequisite.  
   *** CHEM 202, 402 required for ACS-accredited degree.  

Environmental Chemistry  
1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, complete: MATH 200X; PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)  
2. Complete the B.S. degree requirements. (See page 114. As part of the B.S. degree, complete: MATH 201X. Chemistry foundation courses may be used toward partial fulfillment of the natural science requirement.)  
3. Complete the following:*  
   CHEM 105X—General Chemistry  
   CHEM 106X—General Chemistry  
   CHEM 202—Basic Inorganic Chemistry  
   CHEM 212—Chemical Equilibrium and Analysis  
   CHEM 313—Chemical Analysis of Dynamic Systems  
   CHEM 321, 322—Organic Chemistry  
   CHEM 324W—Organic Laboratory  
   CHEM 331, 332—Physical Chemistry  
   CHEM 412—Instrumental Analytical Methods  
   CHEM 413W—Analytical Instrumental Laboratory  
   CHEM 434W—Instrumental Methods in Physical Chemistry  
   CHEM 451—General Biochemistry  
   CHEM 481—Seminar  
   CHEM 482O—Seminar  
   CHEM 488—Undergraduate Chemistry and Biochemistry Research (Environmental Topic)  

4. Complete the following:  
   MATH 202X—Calculus  
   STAT 300—Statistics  

5. Complete the following courses:*  
   BIOL 105X—Fundamentals of Biology I  
   BIOL 106X—Fundamentals of Biology II  
   GEOS 101X—The Dynamic Earth  
   GEOS 125X—Humans, Earth, and the Environment  
   ATI 101X—Weather and Climate of Alaska  

6. Complete 1 of the following advanced courses:*  
   BIOL 271—Principles of Ecology  
   BIOL 342—Microbiology  
   BIOL 443—Microbial Ecology  
   BIOL 480—Water Pollution Ecology  
   BIOL 483—Stream Ecology  
   ENVE 458—Energy and the Environment  
   NRM 380W—Soils and the Environment  
   ATM 401—Fundamentals of Atmospheric Science  
   CHEM 402—Advanced Inorganic Chemistry  

7. Complete 1 of the following advanced courses:*  
   BIOL 442W/2—Advanced Microbiology  
   CHEM 406—Atmospheric Chemistry  
   CHEM 436—Advanced Biochemistry  
   CE 441—Environmental Engineering  
   GEOS 417—Introduction to Geochemistry  

8. Minimum credits required .....................................................130  
   * Student must earn a C grade or better in each course.  

Jurisprudence  
1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, complete: MATH 200X; PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)  
2. Complete the B.S. degree requirements. (See page 114. As part of the B.S. degree, complete: MATH 201X. Chemistry foundation courses may be used toward partial fulfillment of the natural science requirement.)  
3. Complete the program (major) requirements as listed under Chemistry—B.A. degree.  
4. Complete the following chemistry requirements:*  
   CHEM 402—Inorganic Chemistry  
   CHEM 431—General Biochemistry  
   CHEM 488—Undergraduate Chemistry and Biochemistry Research (Environmental Topic)  

5. Complete the following justice requirements:*  
   JUST 110—Introduction to Justice  
   JUST 222—Research Methods  
   JUST 251—Criminology  
   JUST 300X—Ethics and Justice**  
   JUST 354—Procedural Law  
   JUST 454W—Advanced Problems in Procedural Law  

6. Minimum credits required .....................................................130  
   * Student must earn a C grade or better in each course.  
   ** JUST 300X may not be used to fulfill core ethics requirement.  

Requirements for Chemistry Teachers (grades 7–12)  
1. Complete all the requirements of the chemistry B.A. or B.S. degree you wish to seek.  
2. All prospective chemistry teachers must complete the following:  
   CHEM 451—General Biochemistry  
   CHEM 488—Undergraduate Chemistry and Biochemistry Research  

UNIVERSITY OF ALASKA FAIRBANKS  
Office of Admissions and the Registrar • P.O. Box 757480 • Fairbanks, AK 99775-7480 • admissions@uaf.edu • www.uaf.edu  
Regional campuses: Anchorage, Cordova, Delta Junction, Fairbanks, Juneau, Kusilvak, Northway and Unalaska-Dutch Harbor, Prince of Wales.  
UAF is an AA/EQ employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/titleIXcompliance/nondiscrimination.
3. All prospective science teachers must complete one of the following:
   PHIL 380—Conceptual Foundations of Science (3)
   or PHIL 382—Science and Technological Limits (3)
   or PHIL 481—Philosophy of Science (3) ..........................3

Note: We strongly recommend that prospective secondary science teachers seek advising from the UAF School of Education early in your undergraduate degree program so that you can be appropriately advised of the state of Alaska requirements for teacher licensure. You will apply for admission to the UAF School of Education’s post-baccalaureate teacher preparation program, a one-year intensive program, during your senior year. Above requirements apply to all candidates who apply to the UAF School of Education Spring 2006 or later for licensure in chemistry.

Minor
Chemistry

1. Complete the following:
   CHEM 105X—General Chemistry .........................................4
   CHEM 106X—General Chemistry .........................................4

Baccalaureate Core Requirements
All degrees (e.g. B.A., B.S., etc.) require additional courses. Refer to specific degree and program requirements.

COMMUNICATION (9)

Complete the following:
ENGL 111X ..............................................................................(3)
ENGL 190H may be substituted.

Complete one of the following:
ENGL 211X OR ENGL 213X ..................................................(3)

Complete one of the following:
COMM 131X OR COMM 141X ..................................................(3)

PERSPECTIVES ON THE HUMAN CONDITION (18)

Complete all of the following four courses:
ANTH 100X/SOC 100X .................................................................(3)
ECON 100X OR PS 100X .............................................................(3)
HIST 100X ................................................................................(3)
ENGL/FL 200X ...........................................................................(3)

Complete one of the following three courses:
ART/MUS/THR 200X, HUM 201X OR ANS 202X ......................(3)

Complete one of the following six courses:
BA 323X, COMM 300X, JUST 300X, NRM 303X, 
PS 300X OR PHIL 322X .................................................................(3)

OR complete 12 credits from the above courses PLUS
* two semester-length courses in a single Alaska Native language or other 
  non-English language OR 
* three semester-length courses (9 credits) in American Sign Language 
  taken at the university level.

MATHEMATICS (3)

Complete one of the following:
MATH 107X, MATH 161X OR MATH 103X .................................(3-4)
* No credit may be earned for more than one of MATH 107X or 161X.

OR complete one of the following:*
MATH 200X, MATH 201X, MATH 202X, 
MATH 262X OR MATH 272X ...................................................(4)
* Or any math course having one of these as a prerequisite

NATURAL SCIENCES (8)

Complete any two (4-credit) courses:
ATM 101X ..................................................................................(4)
BIOL 100X ..................................................................................(4)
BIOL 103X ..................................................................................(4)
BIOL 104X ..................................................................................(4)
BIOL 105X ..................................................................................(4)
BIOL 106X ..................................................................................(4)
BIOL 111X ..................................................................................(4)
BIOL 112X ..................................................................................(4)
CHEM 100X ................................................................................(4)
CHEM 103X ................................................................................(4)
CHEM 104X ................................................................................(4)
CHEM 105X ................................................................................(4)
CHEM 106X ................................................................................(4)
GEOG 205X ................................................................................(4)
GEOS 100X ................................................................................(4)
GEOS 101X ................................................................................(4)
GEOS 112X ................................................................................(4)
GEOS 120X ................................................................................(4)
GEOS 125X ................................................................................(4)
MSL 111X ................................................................................... (4)
PHYS 102X ..................................................................................(4)
PHYS 103X ..................................................................................(4)
PHYS 104X ..................................................................................(4)
PHYS 113X ..................................................................................(4)
PHYS 116X ..................................................................................(4)
PHYS 175X ..................................................................................(4)
PHYS 211X ..................................................................................(4)
PHYS 212X ..................................................................................(4)
PHYS 213X ..................................................................................(4)

LIBRARY AND INFORMATION RESEARCH (0–1)
Successful completion of library skills competency test OR
LS 100X or 101X prior to junior standing ....................................(0–1)

UPPER-DIVISION WRITING AND ORAL COMMUNICATION (0)

Complete the following:
Two writing intensive courses designated (W) ..........................(0)
One oral communication intensive course designated (O) ...........(0)
OR two oral communication intensive courses designated (O/2), at the 
upper-division level (see degree and/or major requirements) .........(0)

TOTAL CREDITS REQUIRED ..........................................................38–39