

**PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR/MINOR)**

**SUBMITTED BY:**

	<b>Chemistry and Biochemistry</b>		<b>CNSM</b>
	<b>William Simpson</b>		<b>474-7235</b>
	<b><u><a href="mailto:wrsimpson@alaska.edu">wrsimpson@alaska.edu</a></u></b>		<b>William Simpson</b>

See <http://www.uaf>.

Environmental Chemistry and related disciplines. The degree program is designed to provide students with core training in the chemical sciences, while providing exposure to a broad range of related disciplines. Students work with a faculty advisor to select required elective courses that best meets their interests and academic goals.

Students are also required to enroll in research credits with a focus on an Environmental Chemistry topic. This provides an opportunity for students to gain first hand experience

requirements, complete: MATH F200X; PHYS F103X and PHYS F104X, or PHYS F211X and PHYS F212X.)

2. Complete the [B.S. degree requirements](#). (As part of the B.S



ENVE F458--Energy and the Environment--3 credits  
NRM F380W--Soils and the Environment--3 credits  
ATM F401--Introduction to Atmospheric Science--3 credits  
CHEM F402--Advanced Inorganic Chemistry--3 credits

7.

or later for licensure in chemistry.

## Minor

### Chemistry

1. Complete the following:  
CHEM F105X--General Chemistry I--4 credits  
CHEM F106X--General Chemistry II--4 credits
2. Complete the following approved electives:  
CHEM F212--Chemical Equilibrium and Analysis\*--4 credits  
CHEM F321--Organic Chemistry I--3 credits  
CHEM F322--Organic Chemistry II--3 credits  
CHEM F331--Physical Chemistry I--4 credits  
CHEM F332--Physical Chemistry II--4 credits
3. Complete one of the following additional chemistry lab courses:  
CHEM F202--Basic Inorganic Chemistry--3 credits  
CHEM F324W--Organic Chemistry Lab--4 credits
4. Minimum credits required--29 - 30 credits

### Biochemistry

1. Complete the following foundation courses:  
CHEM F105X--General Chemistry I--

chemistry graduates elect to pursue advanced M.S., Ph.D., pharmacology or M.D. degrees.

The chemistry curriculum meets the American Chemical Society standards of introducing the basics of general, organic, inorganic, physical and analytical chemistry, 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 chemistry. Limited teaching assistantships are often available for upper-division students, which strengthens leadership and communication skills.

The Bachelors degree in Environmental Chemistry prepares students for public and private sector jobs related to Environmental Science and Technology, or for graduate programs in Environmental Chemistry and related disciplines. The degree program is designed to provide students with core training in the chemical sciences, while providing exposure to a broad range of related disciplines. Students work with a faculty advisor to select required elective courses that best meets their interests and academic goals.

Students are also required to enroll in research credits with a focus on an Environmental Chemistry topic. This provides an opportunity for students to gain first hand experience working on advanced topics that are generally outside of the scope of an undergraduate curriculum. For a description of the field of Environmental Chemistry, see the Environmental Chemistry graduate program.

The chemistry and biochemistry department is housed in the Natural Sciences Facility, which is equipped with research-grade instrumentation, including a high field nuclear magnetic resonance 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, 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, Mestree) and other software such as Word, Excel, PowerPoint and Endnote are available for all students enrolled in F200-level or above courses.

Major—B.A. Degree

- 6.—Complete the [general university requirements](#). (As part of the core curriculum requirements, complete: MATH F200X; PHYS F103X and PHYS F104X, or PHYS F211X and PHYS F212X.)
  - 7.—Complete the [B.A. degree requirements](#). (As part of the B.A. degree requirements, complete: MATH F201X.)
  - 8.—Complete the following program (major) requirements:\*
- CHEM F105X—General Chemistry I—4 credits
  - CHEM F106X—General Chemistry II—4 credits
  - CHEM F202—Basic Inorganic Chemistry—3 credits
  - CHEM F212—Chemical Equilibrium and Analysis—4 credits
  - CHEM F321—Organic Chemistry I—3 credits
  - CHEM F322—Organic Chemistry II—3 credits
  - CHEM F324W—Organic Laboratory—4 credits
  - CHEM F331—Physical Chemistry I—4 credits
  - CHEM F332—Physical Chemistry II—4 credits

~~CHEM F413W—Analytical Instrumental Laboratory—3 credits~~

~~CHEM F434W—Instrumental Methods in Physical Chemistry—3 credits~~





13. Complete two of the following courses:\*
- ~~BIOL F115X Fundamentals of Biology I 4 credits~~
  - ~~BIOL F116X Fundamentals of Biology II 4 credits~~
  - ~~GEOS F101X The Dynamic Earth 4 credits~~
  - ~~GEOS F125X Humans, Earth, and the Environment 4 credits~~
  - ~~ATM F101X Weather and Climate of Alaska 4 credits~~
14. Complete one of the following advanced courses:\*
- ~~BIOL F271 Principles of Ecology 4 credits~~
  - ~~BIOL F342 Microbiology 4 credits~~
  - ~~BIOL F443W Microbial Ecology 3 credits~~
  - ~~BIOL F483 Stream Ecology 3 credits~~
  - ~~ENVE F458 Energy and the Environment 3 credits~~
  - ~~NRM F380W Soils and the Environment 3 credits~~
  - ~~ATM F401 Introduction to Atmospheric Science 3 credits~~
  - ~~CHEM F402 Advanced Inorganic Chemistry 3 credits~~
15. Complete one of the following advanced courses:\*
- ~~CHEM F406 Atmospheric Chemistry 3 credits~~
  - ~~CE F341 Environmental Engineering 4 credits~~
  - ~~GEOS F417 Introduction to Geochemistry 3 credits~~
16. Minimum credits required—130 credits
- \* Student must earn a C grade or better in each course.

#### Forensic Chemistry

7. Complete the [general university requirements](#). (As part of the core curriculum requirements, complete: MATH F200X; PHYS F103X and PHYS F104X, or PHYS F211X and PHYS F212X.)
8. Complete the [B.S. degree requirements](#). (As part of the B.S. degree, complete: MATH F201X. Chemistry foundation courses may be used toward partial fulfillment of the natural science requirement.)
9. Complete the program (major) requirements as listed under Chemistry—B.A. degree.
10. Complete the following chemistry requirements:\*
- ~~CHEM F402 Inorganic Chemistry 3 credits~~
  - ~~CHEM F450 General Biochemistry Macromolecules (3)~~  
—or ~~CHEM F451 General Biochemistry Metabolism 3 credits~~
  - ~~CHEM F488 Undergraduate Chemistry and Biochemistry Research 2 credits~~
11. Complete the following justice requirements:\*
- ~~JUST F110 Introduction to Justice 3 credits~~
  - ~~JUST F222 Research Methods 3 credits~~
  - ~~JUST F251 Criminology 3 credits~~
  - ~~JUST F300X Ethics and Justice\*\* 3 credits~~
  - ~~JUST F354 Procedural Law 3 credits~~
  - ~~JUST F454W Advanced Problems in Procedural Law 3 credits~~
12. Minimum credits required—130 credits
- \* Student must earn a C grade or better in each course.
- \*\* JUST F300X may not be used to fulfill core ethics requirement.

#### Requirements for Chemistry Teachers (grades 7–12)

4. Complete all the requirements of the chemistry B.A. or B.S. degree you wish to seek.
5. All prospective chemistry teachers must complete the following:
- ~~CHEM F450 General Biochemistry Macromolecules (3)~~



Minimum Requirements for Degrees: 120 credits



CHEM F106X--General Chemistry II--4 credits

CHEM F202--Basic Inorganic Chemistry--3 credits

CHEM F212--Chemical Equilibrium and Analysis--4 credits

CHEM F321--Organic Chemistry I--3 credits

CHEM F322--Organic Chemistry II--3 credits

CHEM F324W--Advanced Organic Laboratory--4 credits

CHEM F331



- MATH F202X—Calculus III --4 credits
5. Complete 10 credits of the following Biology / Biochemistry courses:
- CHEM F261—Introduction to Cell and Molecular Biology--4 credits
- CHEM F418W—Developmental Biology--3 credits
- CHEM F474—Neurochemistry--3 credits
- CHEM F470—Cellular and Molecular Neuorscience--3 credits
- CHEM F455W,O—Environmental Toxicology--3 credits
- BIOL F240—Beginnings in Microbiology--4 credits
- BIOL F342—Microbiology--4 credits
- BIOL F362—Principles of Genetics--4 credits
- BIOL F417O—Neurobiology--3 credits
- BIOL F465—Immunology--3 credits
- BIOL F462O—Concepts in Infectious Disease--3 credits
- BIOL F453O/2—Molecular Biology--4 credits
- BIOL F310—Animal Physiology--4 credits
- BIOL F402W—Biomedical and Research Ethics--3 credits



- CHEM F322--Organic Chemistry II--3 credits  
CHEM F331--Physical Chemistry I--4 credits
3. Complete one of the following additional chemistry lab courses:  
CHEM F202--Basic Inorganic Chemistry--3 credits  
CHEM F323--Organic Chemistry Lab--3 credits  
Minimum credits required-- 25 credits

### **Biochemistry**

1. Complete the following foundation courses:  
CHEM F105X--General Chemistry I--4 credits  
CHEM F106X--General Chemistry II--4 credits
2. Complete the following:  
CHEM F321--Organic Chemistry I--3 credits  
CHEM F322--Organic Chemistry II--3 credits  
CHEM F331--Physical Chemistry I--4 credits  
CHEM F451--General Biochemistry -- Metabolism--3 credits
3. Complete one of the following chemistry lab courses:  
CHEM F202--Basic Inorganic Chemistry--3 credits  
CHEM F212--Chemical Equilibrium and Analysis--4 credits  
CHEM F323--Organic Chemistry Lab--3 credits
4. Minimum credits required--24 - 25 credits

#### **D. ESTIMATED IMPACT**

*WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.*

**These changes keep essentially the same courses, but just allow more flexibility for students with the intended outcome of helping Chemistry major students to achieve their degree in a timely manner, and possibly encourage others to major in Chemistry. This change might add to student enrollment in upper-division chemistry and biology (for the Biochemistry concentration) courses. However, there is capacity available in upper division courses, so this change probably will not require new sections to be offered.**

**IMPACTS ON PROGRAMS/DEPTS:**

for next academic year. The University-wide program review process also identified the B.A. degree, with the statement: “The department should further investigate the utility of the BA program.” Therefore, we are responding to the program review and our department’s SLOA process.

See attached signatures.

**JUSTIFICATION FOR ACTION REQUESTED**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_