

#7-GP Ch.
and memo

Revised 2/28/2014

FORMAT 5

Submit originals and one copy and electronic copy to Governance/Faculty Senate Office (email electronic copy to jbharvie@alaska.edu)

PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR)**SUBMITTED BY:**

Department	Chemistry and Biochemistry	College/School	CNSM
Prepared by	William Simpson	Phone	474-7235
Email Contact	wrsimpson@alaska.edu	Faculty Contact	William Simpson

See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM	Environmental Chemistry
Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)	M.S. and Ph.D. degrees

A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)

The department of Chemistry and Biochemistry is reorganizing its Masters programs such that the M.S. programs in Biochemistry and Molecular Biology and Environmental Chemistry will be concentrations within the Chemistry M.S. degree.

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:**Environmental Chemistry**

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

M.S., PH.D. DEGREES

Minimum Requirements for Degrees: M.S.: 30 credits; Ph.D.: 18 thesis credits

Environmental Chemistry is a diverse and highly interdisciplinary field that focus on the chemical processes influencing the composition and chemical speciation of natural systems (air, water and soils), the chemical fate and mobility of contaminants in the environment, chemical processes that affect the toxicity and bioavailability of contaminants and chemical aspects of contaminant remediation and pollution prevention (green chemistry). The common link to all these areas of study is a focus on the underlying chemical structure, reactivity and mechanisms that dictate the extent and rates of environmentally important chemical reactions. Environmental chemistry is a challenging field, requiring core training in physical, analytical, organic and inorganic chemistry and an understanding of how these disciplines can be applied to complex environmental systems. It is also a highly rewarding discipline, as it provides a quantitative and fundamental approach to understanding the processes that influence the quality of the environment we live and work in.

The UAF Department of Chemistry and Biochemistry offers B.S., M.S. and Ph.D. degrees in Environmental Chemistry. The program provides education and research opportunities focused on the molecular scale aspects of environmental science. The program defines three tracks to meet a wide range of student interest, including (i) Atmospheric Chemistry (ii) Aqueous/Environmental Geochemistry, and (iii) Environmental Toxicology and Contaminant Fate. Students may also design a custom focus area, subject to approval by their advisory committee.

Our faculty are involved in a wide range of projects from field studies of chemical transformation and transport, to laboratory and modeling studies of the basic mechanisms of environmental reactions, to the development of novel chemistry useful in contaminant remediation. The program is centered in the Natural Sciences Building on the UAF campus that houses state-of-the-art classrooms, laboratories and computer facilities to support education and research activities. Located in the "Heart of Alaska," UAF is home to numerous research institutes and centers that focus on Arctic science and engineering and provide great opportunities for collaboration and cross-disciplinary studies focused on the chemistry of polar and sub-arctic systems.

The graduate program in environmental chemistry provides advanced training in the concepts and methods of molecular environmental sciences. The M.S. degree prepares students for careers in the environmental science and technology sector as a specialist in the analysis and interpretation of environmental chemical data and/or for more advanced studies in environmental Chemistry or related disciplines. The requirement of a master's thesis provides an opportunity for students to gain expertise in a particular sub-discipline and, more importantly, gain experience in research methods, presentation skills and critical thinking. The Ph.D. provides advanced training beyond the level of a master's degree with the expectation that Ph.D. recipients will be acknowledged as experts in their particular topic of study. This is accomplished primarily through the Ph.D. thesis, which is a body of independent research that presents new findings on forefront topics related to molecular processes in the environment. The Ph.D. degree in environmental chemistry prepares students for careers in academia or the public and private research sectors. Graduate (M.S. and Ph.D.) students in the environmental chemistry program are typically supported through teaching and research assistantships or fellowships.

Graduate Program -- M.S. Degree

Complete the general university requirements.
Complete the master's degree requirements.
Complete two of the following environmental core courses:
CHEM F605--Aquatic Chemistry--3 credits
CHEM F606--Atmospheric Chemistry--3 credits
CHEM F631--Environmental Fate and Transport--3 credits
CHEM F655--Environmental Toxicology--3 credits
Complete two seminar courses
CHEM F691--Research Presentation Techniques--1 credit
CHEM F692--Seminar I
Complete approved electives*--3 - 6 credits
Complete a thesis--12 credits
Minimum credits required--30 credits

Graduate Program -- Ph.D. Degree

Complete the general university requirements.
Complete the Ph.D. degree requirements.
Complete three of the following core courses:
CHEM F605--Aquatic Chemistry--3 credits
CHEM F606--Atmospheric Chemistry--3 credits
CHEM F631--Environmental Fate and Transport--3 credits
CHEM F655--Environmental Toxicology--3 credits
Complete two seminar courses.
CHEM F691--Research Presentation Techniques--1 credit
CHEM F692--Seminar I
Complete approved electives*--3 - 6 credits
Complete a thesis--18 credits
Minimum credits required--32 credits

** Approved electives (both M.S. and Ph.D.) are specified by the student's committee. The following tracks are defined as a guide. Within these tracks students will be expected to complete as part of the core and electives:*
Atmospheric Chemistry: CHEM F601, CHEM F605, CHEM F606 and CHEM F631
Aqueous/Environmental Geochemistry: CHEM F605, CHEM F606 or CHEM F631, GEOS F618 and CHEM F609/GEOS F633.

Environmental Toxicology and Contaminant Fate: CHEM F605 or CHEM F606, CHEM F631 and CHEM F655

A customized focus area may be developed based on an appropriate sequence of core and elective courses, subject to approval by the student's advisory committee.

See Biochemistry and Molecular Biology.

See Chemistry.

C. PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES:
(Underline new wording ~~strike through old wording~~ and use complete catalog format)

Environmental Chemistry

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

M.S., Ph.D. DEGREES

Minimum Requirements for Degrees: ~~M.S.: 30 credits~~; Ph.D.: 18 thesis credits

Environmental Chemistry is a diverse and highly interdisciplinary field that focuses on the chemical processes influencing the composition and chemical speciation of natural systems (air, water and soils), the chemical fate and mobility of contaminants in the environment, chemical processes that affect the toxicity and bioavailability of contaminants and chemical aspects of contaminant remediation and pollution prevention (green chemistry). The common link to all these areas of study is a focus on the underlying chemical structure, reactivity and mechanisms that dictate the extent and rates of environmentally important chemical reactions. Environmental chemistry is a challenging field, requiring core training in physical, analytical, organic and inorganic chemistry and an understanding of how these disciplines can be applied to complex environmental systems. It is also a highly rewarding discipline, as it provides a quantitative and fundamental approach to understanding the processes that influence the quality of the environment we live and work in.

The UAF Department of Chemistry and Biochemistry offers B.S. and M.S. via concentrations under the Chemistry degree, ~~and Ph.D. degrees in Environmental Chemistry~~. The program provides education and research opportunities focused on the molecular scale aspects of environmental science. The program defines three tracks to meet a wide range of student interest, including (i) Atmospheric Chemistry (ii) Aqueous/Environmental Geochemistry, and (iii) Environmental Toxicology and Contaminant Fate. Students may also design a custom focus area, subject to approval by their advisory committee.

Our faculty are involved in a wide range of projects from field studies of chemical transformation and transport, to laboratory and modeling studies of the basic mechanisms of environmental reactions, to the development of novel chemistry useful in contaminant remediation. The program is centered in the Natural Sciences Building on the UAF campus that houses state-of-the-art classrooms, laboratories and computer facilities to support education and research activities. Located in the "Heart of Alaska," UAF is home to numerous research institutes and centers that focus on Arctic science and engineering and provide great opportunities for collaboration and cross-disciplinary studies focused on the chemistry of polar and sub-arctic systems.

The ~~graduate~~ Ph.D. program in Environmental Chemistry provides advanced training in the concepts and methods of molecular environmental sciences. ~~The M.S. degree prepares students for careers in the environmental science and technology sector as a specialist in the analysis and interpretation of environmental chemical data and/or for more advanced studies in environmental Chemistry or related disciplines. The requirement of a master's thesis provides an opportunity for students to gain expertise in a particular sub-discipline and, more importantly, gain experience in research methods, presentation skills and critical thinking. The Ph.D. provides advanced training beyond the level of a master's degree with the expectation that Ph.D. recipients will be acknowledged as experts in their particular topic of study. This is accomplished primarily through the Ph.D. dissertation thesis, which is a body of independent research that presents new findings on forefront topics related to molecular processes in the environment. The Ph.D. degree in Environmental Chemistry prepares students for careers in academia or the public and private research sectors. Graduate (M.S. and Ph.D.) students in the environmental chemistry program are typically supported through teaching and research assistantships or fellowships. Students interested in a M.S. degree focusing on environmental chemical problems should see the M.S. Chemistry with concentration in Environmental Chemistry program.~~

Graduate Program — M.S. Degree

~~Complete the general university requirements.~~

~~Complete the master's degree requirements.~~

~~Complete two of the following environmental core courses:~~

~~CHEM F605 Aquatic Chemistry 3 credits~~

~~CHEM F606 Atmospheric Chemistry 3 credits~~

~~CHEM F631--Environmental Fate and Transport--3 credits~~
~~CHEM F655--Environmental Toxicology--3 credits~~
~~Complete two seminar courses~~
~~CHEM F691--Research Presentation Techniques--1 credit~~
~~CHEM F692--Seminar 1~~
~~Complete approved electives*--3-6 credits~~
~~Complete a thesis--12 credits~~
~~Minimum credits required--30 credits~~
 Graduate Program -- Ph.D. Degree

Complete the general university requirements.
 Complete the Ph.D. degree requirements.
 Complete three of the following core courses:
 CHEM F605--Aquatic Chemistry--3 credits
 CHEM F606--Atmospheric Chemistry--3 credits
 CHEM F631--Environmental Fate and Transport--3 credits
 CHEM F655--Environmental Toxicology--3 credits
 Complete two seminar courses.
 CHEM F691--Research Presentation Techniques--1 credit
 CHEM F692--Seminar 1
 Complete approved electives*--3-6 credits
 Complete a thesis--18 credits
 Minimum credits required--32 credits

** Approved electives (both M.S. and Ph.D.) are specified by the student's committee. The following tracks are defined as a guide. Within these tracks students will be expected to complete as part of the core and electives:*
Atmospheric Chemistry: CHEM F601, CHEM F605, CHEM F606 and CHEM F631
Aqueous/Environmental Geochemistry: CHEM F605, CHEM F606 or CHEM F631, GEOS F618 and CHEM F609/GEOS F633.
Environmental Toxicology and Contaminant Fate: CHEM F605 or CHEM F606, CHEM F631 and CHEM F655
A customized focus area may be developed based on an appropriate sequence of core and elective courses, subject to approval by the student's advisory committee.

See Biochemistry and Neuroscience ~~Molecular Biology~~.

See Chemistry.

D. ESTIMATED IMPACT

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

This change will simplify paperwork for our M.S. programs by consolidating all Masters under the Chemistry degree. For the past few years, we have used common procedures for all M.S. degrees, so this change is easy to implement.

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
 Include information on the Programs/Departments contacted (e.g., email, memo)

None outside our department

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

The intended learning outcomes from our M.S. programs were very similar before this change, and with this change will be fully unified. The intended outcomes are listed below.

1. Graduates attain a level of technical ability and knowledge to function as professionals in their discipline.
2. Masters graduates have performed research using technical, safety, and problem solving skills to contribute to their field.
3. Communication/presentation skills are consistent with professional standards.

4. Graduates obtain employment or continue education in the field following graduation.

The classes and research contributions (parts 1 and 2) above differ between each concentration, but we can assess the success of each concentration and adjust its requirements to assure that these general learning outcomes are attained.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

This change allows us to consolidate all M.S. programs within our department into one M.S. program with concentrations that reflect our focal areas (those of our two Ph.D. programs). Each of those concentrations have core courses that are parallel to the Ph.D. programs, while the Chemistry M.S. without concentration retains flexibility. This change will simplify procedures for M.S. graduate students by having one unified departmental set of procedures and will allow for better assessment of student learning outcomes through improved statistics arising from larger numbers of students passing through this combined M.S. program. The learning outcomes of all M.S. programs were similar in the past, so this change has minimal impact on intended learning outcomes.

APPROVALS:

See attached signatures and memo

William Simpson

Date 24 Feb 2014 (revised)

Signature, Chair, Program/Department of: Chemistry and Biochemistry

Date

Signature, Chair, College/School Curriculum Council for:

Date

Signature, Dean, College/School of:

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

Date

Signature, Chair, UAF Faculty Senate Curriculum Review Committee

The classes and research contributions (parts 1 and 2) above differ between each concentration, but we can assess the success of each concentration and adjust its requirements to assure that these general learning outcomes are attained.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

This change allows us to consolidate all M.S. programs within our department into one M.S. program with concentrations that reflect our focal areas (those of our two Ph.D. programs). Each of those concentrations have core courses that are parallel to the Ph.D. programs, while the Chemistry M.S. without concentration retains flexibility. This change will simplify procedures for M.S. graduate students by having one unified departmental set of procedures and will allow for better assessment of student learning outcomes through improved statistics arising from larger numbers of students passing through this combined M.S. program. The learning outcomes of all M.S. programs were similar in the past, so this change has minimal impact on intended learning outcomes.

APPROVALS:

William Simpson	Date	20 Sep 2013
Signature, Chair, Program/Department of: Chemistry and Biochemistry		
Thomas E. Rice	Date	10-1-13
Signature, Chair, College/School Curriculum Council for: CNSM		
Paul W. Long	Date	10/2/13
Signature, Dean, College/School of: CNSM		

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

COPY



Department of Chemistry and Biochemistry

900 Yukon Dr., Reichardt Building Room 194
P.O. Box 756150
Fairbanks, AK 99775-6160
(907) 474-5510 • Fax (907) 474-5640
chemistry.uaf@alaska.edu • www.uaf.edu/cnzm

America's Arctic University

3 March 2014

To: Provost Dr. Susan Henrichs
Through: Dr. Paul Layer, Dean, CNSM
From: Dr. Bill Simpson, Chemistry and Biochemistry Chair
Cc: Jayne Harvie, Coordinator, Faculty Senate Office

Subject: Masters of Science program reorganizations

As a result of our Spring 2013 department retreat, we decided to reorganize the three M.S. programs that are within the Chemistry and Biochemistry department. Specifically, we seek to and have submitted paperwork to Faculty Senate for the following actions:

Under the Chemistry M.A. and M.S. program:

- Add two concentrations to the M.S.:
 - Biochemistry and Neuroscience
 - Environmental Chemistry

Under Environmental Chemistry program:

- Retain the Ph.D.
- Suspend admissions to the M.S. and direct students to use the Chemistry M.S. / Environmental concentration instead

Under the Biochemistry and Molecular Biology program:

- Change the program name to Biochemistry and Neuroscience
- Retain the Ph.D.
- Suspend admissions to the M.S. and direct students to use the Chemistry M.S. / Biochemistry and Neuroscience concentration instead.

The net result of these actions is to "unify" our three M.S. degrees to be one M.S. degree, which will have a larger student flow and thus be more easily assessable. Procedures (e.g. comprehensive examinations, committee meeting procedures, assessment, etc.) for each of the separate M.S. degrees were already similar, but with this change, they would all be the same, allowing us to present information more easily to new students. Additionally, unification of the M.S. degrees may increase collaborative opportunities for faculty in the department, who would now share more common ground through this unified M.S. program.

The department still sees the areas of Biochemistry and Neuroscience and Environmental Chemistry as principal focal areas and the Ph.D. programs that we have in these two areas would continue to be our most advanced degrees. Most active research is in these areas, so it is likely that most graduate students will take the new M.S. concentrations. These M.S. degrees lead to high demand jobs in Environmental Chemistry, Neuroscience, and Biomedical areas.

With this memo, we request to suspend admissions and not list the M.S. in Biochemistry and Neuroscience (new name) and the M.S. in Environmental Chemistry the catalog. Students would be directed to take the M.S. Chemistry concentrations of the same name instead. If we find that this new plan is working in a couple of years, we will formally request to eliminate the M.S. programs that have been replaced by concentrations under the M.S. Chemistry.