

✓10 days
✓posted

15-Trial

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FORM 1

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).
See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	Chemistry and Biochemistry	College/School	CNSM
Prepared by	Sarah Hayes	Phone	907-474-7118
Email Contact	s.hayes@alaska.edu	Faculty Contact	Sarah Hayes

1. ACTION DESIRED

(check one):

☒ Trial Course

☐ X

☐ New Course

2. COURSE IDENTIFICATION:

Dept

CHEM

Course #

288294 No. of Credits

2

Justify upper/lower division
status & number of credits:

This course is designed to introduce mid-level undergraduates to research. The course will consist of 1 hour lecture and 3 hours lab per week.

3. PROPOSED COURSE TITLE:

Introduction to Chemical Research

4. To be CROSS LISTED?

YES/NO

no

If yes, Dept:

Course #

NOTE: Cross-listing requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.

5. To be STACKED?

YES/NO

no

If yes, Dept:

Course #

How will the two course levels differ from each other? How
will each be taught at the appropriate level?:

FEB 20 2014

Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee.

Creating two different syllabi—undergraduate and graduate versions—will help emphasize the different qualities of work and learning in two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online – see URL at top of this page.

6. FREQUENCY OF OFFERING:

Every spring

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

**7. SEMESTER & YEAR OF FIRST OFFERING (AY2013-14 if
approved by 3/1/2013; otherwise AY2014-15)**

AY 2014-15

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the Core Review Committee.

COURSE FORMAT:

(check all that apply)

☐ 1☐ 2☐ 3☐ 4☐ 5☒ 6

6 weeks to full semester

OTHER FORMAT (SPECIFY)

Mode of delivery (specify lecture,
field trips, labs, etc)

1 hour lecture, 3 hours lab per week

9. CONTACT HOURS PER WEEK

☐ 1

LECTURE
hours/week

☐ 3

LAB
hours/week

☐

PRACTICUM
hours/week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/-/guidelines-for-computing-/> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION INCLUDING DEPT., NUMBER, TITLE, CREDITS, CREDIT DISTRIBUTION, CROSS-LISTINGS AND/OR STACKING (50 WORDS OR LESS IF POSSIBLE):

EXAMPLE OF A COMPLETE DESCRIPTION:

FISX F487 M, 0 Fisheries Management
3 Credits Offered Spring

Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. Prerequisites: COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X; ENGL F414; FISX F425; or

Governance
2/25/14 TLP

CHEM 288 Introduction to Research

2 Credits Offered Spring

Scientific research is creative and engaging when properly planned and executed. This course introduces students to the process of planning and executing a research project. We will begin with an idea, review primary literature, brainstorm project ideas, pose a testable hypothesis, plan experiments, and execute a small research project.

Pre-requisites: CHEM 212 or CHEM 321 or instructor permission

11. COURSE CLASSIFICATIONS: Undergraduate courses only. Consult with CLA Curriculum Council to apply S or X classification appropriately; otherwise leave fields blank.

X = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.

YES:

NO:

X

If YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Form 6

W = Writing Intensive, Form 7

X = Baccalaureate Core

11.A Is course content related to nonrenew, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES

NO

12. COURSE REPEATABILITY:

Is this course repeatable for credit?

YES

X

NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

Topical areas for potential research areas vary each semester depending on areas of research expertise of mentors enrolled in CHEM 686

How many times may the course be repeated for credit?

1

times

If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?

4

CREDITS

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

13. GRADING SYSTEM: Specify only one. Note: Changing the grading system for a course later on constitutes a Major Course Change - Form 2 form.

Letter:

X

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. Prerequisites

CHEM 212 or CHEM 321 or instructor permission

These will be required before the student is allowed to enroll in the course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

\$100

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No

yes

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously?

Yes/No

no

If yes, give semester, year, course #, etc.:

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

This course requires 1-2 credits of workload for the instructing faculty (shared with proposed 686).

19. LIBRARY COLLECTIONS*HAVE YOU CONTACTED THE LIBRARY COLLECTION DEVELOPMENT OFFICER (KLJensen@alaska.edu, 474-6695) WITH REGARD TO THE ADEQUACY OF LIBRARY/MEDIA COLLECTIONS, EQUIPMENT, AND SERVICES AVAILABLE FOR THE PROPOSED COURSE? IF SO, GIVE DATE OF CONTACT AND RESOLUTION. IF NOT, EXPLAIN WHY NOT.*

No

☒

Yes

☐

CURRENT LIBRARY COLLECTION IS ADEQUATE FOR THE COURSE. THIS COURSE WILL RELY HEAVILY ON ELECTRONIC SUBSCRIPTIONS TO PRIMARY LITERATURE.

20. 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)***21. POSITIVE AND NEGATIVE IMPACTS***PLEASE SPECIFY POSITIVE AND NEGATIVE IMPACTS ON OTHER COURSES, PROGRAMS AND DEPARTMENTS RESULTING FROM THE PROPOSED ACTION.*

This course provides the opportunity for mid-level students to participate in chemical research. The focus of the course is on building the skills (literature review and experiment design) that students need to move from an idea to a successful experiment. After this course, students will likely be much better prepared for the experiment-focused CHEM 488 Research. Students will also provide mentoring opportunities for the professional development of students enrolled in CHEM 686.

JUSTIFICATION FOR ACTION REQUESTED*THE PURPOSE OF THE DEPARTMENT AND CAMPUS-WIDE CURRICULUM COMMITTEES IS TO SCRUTINIZE COURSE CHANGE AND NEW COURSE 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. USE AS MUCH SPACE AS NEEDED TO FULLY JUSTIFY THE PROPOSED COURSE.*

CHEM 288 will focus on building mid-level undergraduate student skills and confidence in planning and executing an independent research project. This course will provide students training in the process of doing research at an earlier stage in their career as well as providing skills that will help students be more successful in CHEM 488 Research.

APPROVALS: Add additional signature lines as needed.

	Date	20 Feb 2014
Signature, Chair, Program/Department of: Chemistry + VSI in Chem/stry		
	Date	2-21-14
Signature, Chair, College/School Curriculum Council for: CNSM		
	Date	2/21/14
Signature, Dean, College/School of: CNSM		

Offerings above the level of approved programs must be approved in advance by the Provost.

	Date	
Signature of Provost (if above level of approved programs)		

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

	Date	
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Signature, Chair

Faculty Senate Review Committee: ☐ CURRICULUM REVIEW ☐ GRAC

☐ CORE REVIEW ☐ SADAC

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	
--	------	--

Signature, Chair, Program/Department of:

	Date	
--	------	--

Signature, Chair, College/School CURRICULUM COUNCIL FOR:

	Date	
--	------	--

Signature, Dean, College/School of:

ATTACH COMPLETE SYLLABUS (as part of this application). This list is online at:
<http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/uaf-syllabus-requirements/>
The Faculty Senate curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course (or changes to it) may be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:

☐ title, ☐ number, ☐ credits, ☐ prerequisites, ☐ location, ☐ meeting time
(make sure that contact hours are in line with credits).

2. Instructor (and if applicable, teaching assistant) information:

☐ Name, ☐ office location, ☐ office hours, ☐ telephone, ☐ email address.

3. Course readings/materials:

☐ Course textbook title, ☐ author, ☐ edition/publisher.
☐ Supplementary readings (indicate whether ☐ required or ☐ recommended) and
☐ any supplies required.

4. Course description:

☐ Content of the course and how it fits into the broader curriculum;
☐ Expected proficiencies required to undertake the course, if applicable.
☐ Inclusion of catalog description is *strongly* recommended, and
☐ Description in syllabus must be consistent with catalog course description.

5. ☐ Course Goals (general), and (see #6)

6. ☐ Student Learning Outcomes (more specific)

7. Instructional methods:

☐ Describe the teaching techniques (e.g. lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

☐ A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

☐ Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

☐ Specify how students will be evaluated, ☐ what factors will be included, ☐ their relative value, and ☐ how they will be tabulated into grades (on a curve, absolute scores, etc.) ☐ Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (Not required in the syllabus, but is a convenient way to publicize this.) Link to PDF summary of grading policy for "C":
http://www.uaf.edu/files/uafgov/Info-to-Publicize-C_Grading-Policy-UPDATED-May-2013.pdf

11. Support Services:

☐ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services: Note that the phone# and location have been updated. <http://www.uaf.edu/disability/> The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials.

☐ State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

5/21/2013

**Introduction to Chemical Research
CHEM 288; Spring 2015**



Course Name: CHEM 288: Introduction to Chemical Research, 2 credits
Prerequisites: CHEM 212 or CHEM 321 or instructor permission
Location:
Meeting Time: 1 hr lecture, 3 hrs lab per week

Instructor: Dr. Sarah Hayes
Office: Reichardt 188
Phone: 907-474-7118
Email: s.hayes@alaska.edu
Office Hours: By appointment, or drop by when my door is open

Blackboard Link: <http://classes.uaf.edu>
Course website: <http://chemresearch.community.uaf.edu> **Now Active, but Developing**
Required Materials: D.R. Cox. Planning of Experiments. Wiley Classics. ISBN: 978-0471574293

Catalogue Course Description: Scientific research is creative and engaging when properly planned and executed. This course introduces students to the process of planning and executing a research project. We will begin with an idea, review primary literature, brainstorm project ideas, pose a testable hypothesis, plan experiments, and execute a small research project.
Pre-requisites: CHEM 212 or CHEM 321 or instructor permission

Expanded Course Description: Scientific research is creative and engaging when properly planned and executed. This course is designed to introduce mid-level undergraduate students to the process of chemical research. Students in this course will begin with an idea, then review primary literature to survey ongoing research in that field, brainstorm project ideas, pose a testable hypothesis, then plan an experiment and execute a small research project. The emphasis of this course is to increase research readiness for students entering CHEM 488 by focusing on the research planning skills, although students will also have supervised hands-on lab experience. Students will have individualized support from graduate students enrolled in CHEM 686 Research Mentoring throughout the semester as they discover the research process. Pre-requisites: CHEM 212 or instructor permission.

Instructional Methods: Undergraduate students will be paired with graduate student mentors enrolled in CHEM 686 Research Mentoring to develop and execute a research project. The emphasis of this course is on planning a research project through mentoring interactions with graduate students and faculty. Lectures will provide information on topics relevant to project planning while the actual planning and execution will occur during lab time.

Course Goals: Students will learn and practice the process of developing an idea into a testable hypothesis and planning a research project to address their hypothesis. At the conclusion of this course, students will present their research plan and the results of preliminary investigations at the Department Poster Session as well as have a research proposal to potentially submit for funding to continue their project.

Student Learning Outcomes:

- Students will be ready to plan their future research projects. Beginning with an idea and developing a thoughtful research plan to test their hypothesis.
- Students will be exposed to the creativity and excitement of chemical research.

Student Projects:

Student project topics will vary based on the expertise of graduate students enrolled in CHEM 686 and vary each semester. An example project might be an investigation of toxic metals present in mine tailings as a function of particle size, which affects transportability, solubility, and bioaccessibility. This would involve drying soils, size separation using sieves and settling rate in water. Each size fraction could then be analyzed for elemental composition using bulk X-ray Fluorescence by preparing a pressed pellet. Another example project might involve dissolution a variety of size fractionated aerosol particulate samples by acid digestion and subsequent analysis by Inductively Coupled Plasma- Mass Spectrometry. Determining the size fractions metals are associated with is a critical component of determining the distance traveled by particulate matter.

Course Evaluation:

There are **1000 total points available** in this class. Grades are assigned as follows: 1000-900 A, 900-800 B, 800-700 C, etc.

Assignment	Points
Completion of safety training	50
Proposal format, proposal topic	30
Lab rotation summaries	20
Project ideas	100
Literature review	100
Research Project plan	100
Revised Research Project plan	50
Research proposal drafts	200
Proposal peer reviews	50
Research Proposal II	50
Poster	100
Mentor and instructor evaluation	100
Final research proposal	100
Total	1000

Safety training- Students will perform all safety trainings required by the Department of Chemistry.

Lab shadowing summaries- Undergraduate students will participate in shadowing opportunities with graduate students. The students will then write a summary of their experiences.

Research plan- Students will progressively work toward developing a research plan. Assignments will include a research area, research topic, literature review, research plan, background, research proposal, peer review of two other proposals, proposal revisions, and a poster.

Research Proposal- Students will generate and revise an original research proposal with preliminary data that can be submitted for funding to continue the research project.

Poster- Students will present their research plan and the preliminary results at the Department Poster Session and Potluck.

Introduction to Chemical Research
CHEM 288; Spring 2015



Mentor and instructor evaluation- Students will have periodic feedback on their progress in their research progress with their mentor and instructor.

Course Policies:

Classroom Behavior and Late work - Students are expected to conduct themselves in a professional manner at all times. Disrespect of the classroom learning environment, instructors or mentors, and fellow students will not be tolerated! Late work is accepted at a 10% per day reduction of the points possible. This is in an effort to keep the entire class moving through the projects efficiently. Continued attendance to class indicates each student agrees to the policies set forth in this syllabus.

Honor code and Academic integrity- Students are expected to conduct themselves in accordance with the UAF Honor code. The Chemistry Department policy states: *Any student caught cheating will be assigned a course grade of F. The students' academic advisor will be notified of this failing grade and the student will not be allowed to drop the course.*

Disability Services- I will work with the Office of Disabilities Services (208 Whitaker Bldg, 474-5655) to provide reasonable accommodation to students with disabilities. It is the student's responsibility to make an appointment with me to discuss appropriate accommodations within the first two weeks of the first class meeting. A letter from disabilities services must be provided for discussion at that time.

**Analysis of Environmental Samples
CHEM 288/686; Spring 2015**

Tentative Schedule

Week of	Lecture	Items due 288	Items due 686
1-15	Introduction to course, Research interests		Lecture signup
	Graduate student overviews 288- Safety training, 686- Mentor training	All safety trainings complete	Research introduction Mentoring Training
1-19	The process of planning research	Research area- general	Lab rotation plan
	Safety in a research lab		
1-26	Funding your project		
	Lab rotations		
2-2	Keeping Records	Proposal format	
	Lab rotations		
2-9	Surveying Primary Literature	Rotations summaries	Rotation self reflection
	Literature review		
2-16	Stating a testable hypothesis		
	Literature review		
2-23	Experimental design and statistics	Project ideas	
	Brainstorming project ideas		
3-2	IRB and compliance	Literature review	Brainstorming notes
	Project planning		
3-9	Writing an SOP	Project plan	Literature review reviews
	288: Write SOP; 686: review project plans		Project plan reviews, mentee evaluations
3-16	Spring Break		
3-23	TBD	Revised project plans	
	Reviewing project plans w faculty		
3-30	TBD	Research Proposal Draft 1	
	Research Project		
4-6	How to make a poster	Research Proposal Peer Reviews	Research Proposal Reviews (mentees)
	Research Project		
4-13	TBD	Revised Proposals Draft 2, Poster	
	Research project		
4-20	TBD	Revised Proposals Draft 2, Poster	
	Research project		
4-27	TBD		Proposal Reviews (non-mentees)
	Exit Interviews, poster practice	Mentor evaluations	Mentee evaluations, self evaluations
4-30	Students present at department potluck		
Finals		Final research proposal (due 5-8)	



Department of Chemistry and Biochemistry

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America's Arctic University

To: Susan Henrichs, Provost

Through: Paul Layer, CNSM Dean

Through: William Simpson, Department Head Chemistry and Biochemistry

From: Sarah Hayes

Date: December 13, 2013

Regarding: Justification of \$100 lab fee for proposed CHEM 288
Detail Code: FCH1

This memo is justifying the lab fees charged to students enrolled in CHEM 288 Introduction to Chemical Research, a lab course focusing on planning and executing a unique research project. Since students will be working with graduate students in research labs, and likely using expensive instrument time, reagents, and other consumables for this course will be more costly than for some of the more standard courses where all students are performing the same experiment in any given week. I estimate the costs for reagents and consumables in this course required to execute the undergraduate-planned experiments to be \$50-70 per student, depending on the project. The remainder of the fees will be used to cover reagent costs for instruments owned communally within the department and minimal use of instruments that are not department-owned, such as those in the Advanced Instrumentation Laboratory. While costly (Hourly: ICP-MS \$50; SEM \$33; XRF \$15; Microprobe \$50), some graduate students rely heavily on these analytical tools, and undergraduate exposure to these instruments is an exciting component of this course.

CNSM Review

Tom Green, Chair

Reviewer 1

Chem 686

This course is for graduate students to learn how to mentor undergrads in research. Should it be a stacked 486-686, rather than just 686? The listing is confusing that way. Oh I see. The grad students will be mentoring undergrads in the Chem 288 class. Does this work? I guess?

I agree the use of the word “fun” in the syllabus does not actually belong there. It's too vague.

I like the idea here but from the syllabus I don't get a really good sense for the types of projects the grad students will be mentoring (ie what exactly will the undergrads be doing that they will be mentored on?).

I would like to see a brief description of the types of research the undergrads would be doing. Perhaps an example of one of the lab projects?

The schedule needs approximate dates. Just breaking it up into weeks omits things like Spring Break, etc. What day/time will lecture versus lab be held?

How will “mentoring” be evaluated? It is not a quantitative thing. How will successful mentorship outcomes be evaluated? For example, you could have an excellent undergrad who needs little mentorship and does very well, versus a poor undergrad who does not do well. The excellent undergrad will probably reflect well on the grad student mentor and the poor undergrad will reflect poorly on their mentor. So how will undergrad student abilities be factored in or out of how the grad students are evaluated?

Chem 288

I can't evaluate this one without an attached syllabus.

Reviewer 2

CHEM 288:

1. "ideas" is misspelled in the Catalog Description (#10.)
2. In Course Classifications (#11), there are no entries -- presumably both are "NO".
3. Then there's the "Instructor permission" situation -- I'm still not sure which direction the prevailing wind is going, but seem to recall that the campus committee wants them removed (#10; #14.)
4. NO SYLLABUS IS ATTACHED.
5. The memo for the associated fee is not attached.

CHEM 686:

1. Description in Course Identification (#2) refers to *under* graduates, and thus is at odds with the course numbering. I suggest a rewording, e.g. an appropriate synopsis from the Catalog Description (#10.)
2. In Course Classifications (#11), there are no entries -- presumably both are "NO".
3. The decision to award a grade for a course which is presumably based on mentoring seems unwise, for a number of reasons, and I suggest that the Chemistry Department reconsider changing the Grading System to Pass/Fail.
4. There is a disconnect between the Estimated Impacts (#18) given for CHEM 288 and for CHEM 686 -- in the proposal for the former, it states that there will be faculty workload impact, to be shared with the latter, while in the proposal for the latter, there is no "substantial" impact at all. These two sections need to be reconciled.
5. This is trivial, but noted in passing: the third page of the syllabus is numbered "1".

Final comments. I am unhappy to see the use, once in each proposal, of the adjective "fun." This is not an appropriate official metric for any meaningful collegiate course. It may or may not come to pass, for better or for worse, but it is an unnecessary quality for successful instruction at this level.