



CHEM 694
Spring 2015

Course Name: CHEM 694: Chemical Research Mentoring
Prerequisites: Graduate standing
Location:
Meeting Time: 1 hr lecture, 3 hrs lab per week

Instructor: Dr. Sarah Hayes
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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: J. Nakamura, D.J. Shernoff, C.H. Hooker. Good Mentoring: Fostering Excellent Practices in Higher Education. Wiley. ISBN: 978-0470189634.

Catalogue Course Description: This course provides graduate students the opportunity to mentor undergraduates in chemical research within a structured environment, from developing a research idea to executing a small research project. The focus of this course is to refine mentoring skills that contribute to the professional development of maturing chemical professionals.

Expanded Course Description: This course provides graduate students the opportunity to mentor undergraduates in chemical research within a structured environment. Graduate students mentor mid-level undergraduate students (enrolled in CHEM 288) in all phases of planning and executing an independent research project. Students in this course will mentor undergraduates in developing a research idea, reviewing topical primary literature, posing a testable hypothesis, planning an experiment, and executing a small research project. The focus of this course is to refine mentoring skills that contribute to the professional development of maturing colleagues.

Instructional Methods: Students will each be assigned 1-3 undergraduate students (depending on enrollment in CHEM 288 and student interests) to mentor in developing and executing a research project. The emphasis of this course is on planning a research project and students will also be responsible for presenting lectures to CHEM 288 students providing information on topics relevant to project planning.

Course Goals: Students will mentor undergraduate students in developing and testing a hypothesis to develop mentoring skills. Through teaching research relevant skills, students will refine their own understanding of the research process.

Student Learning Outcomes:

- Students will improve mentoring skills and be ready to mentor junior students in their own research groups.

- Students will have a refined understanding of the research process that can be applied to their own research project.

Example Student Projects: Student project topics will vary based on the expertise of graduate students enrolled in CHEM 694 and vary each semester.

- 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.
- Investigation of chemical moieties present in 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
Research introduction	100
Completion of mentoring training	50
Lab rotation plan, execution, and reflection	250
Feedback on mentee assignments	200
Lectures	250
Mentee and instructor evaluation, Self-reflection	150
Total	1000

Research introduction- Prepare and deliver a 10-minute presentation on your research area and project.

Mentoring training- Students will perform a 3-hour mentoring training session. This will either be performed by the URSA director (who has volunteered a presentation on this topic) or will be based on material covered at the Howard Hughes Medical Institute short course entitled "Entering Mentoring".

Lab rotation activity- Students will design and execute an informative and engaging overview of research and lab-based activity for students to participate in their research project. Students are encouraged to select an experiment that involves using an interesting instrument (fluorescence microscope, GC-MS, etc) to engage students in their research. Afterwards, students will write a self-reflection on what they learned during this exercise.

Lecture- Students will use materials provided to design two lectures on a research topics to be delivered to the class.

Feedback on Mentee writing- Students will review undergraduate assignments and provide substantive comments, both positive and negative, and concrete suggestions for improvement. Assignments include: literature review, project plan, proposal reviews (both their mentees and the rest of the class).

Mentee and instructor evaluations, and self-reflection- Students will submit a written self-reflection, then meet with the instructor to go over written comments from mentees at the end of the semester.

Points associated with the Lab Rotation, Lecture, and Mentoring Evaluations will be assigned by the instructor, with based on of student preparation for the activity (based on materials submitted by CHEM

686 students), delivery of activity either based on instructor judgment or directed evaluations from undergraduates in CHEM 288, and on the basis of student self-evaluations. Additional assignment-specific rubrics are available on the website.

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 mentees, and fellow students will not be tolerated! Late work is not accepted 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.