

## CHEM 694: Chemical Research Mentoring

Course Name: CHEM694: ChemicalResearch Mentoring2 credits  
 Prerequisites: Graduate standings scientific discipline  
 Lecture/ Lab: Monday 2:15-6:15, REIC 138  
 Discussion:

Instructor : Dr. Sarah Hayes  
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Blackboard Link: <http://classes.uaf.edu>  
 Course website: <http://chemresearch.community.uaf.edu>  
 Required materials: On Being A Scientist: A Guide to Responsible Conduct in Research, 3rd Edition  
 The National Academies Press: Washington DC. ISBN: 97809-11970-2

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 is paired with CHEM294 (Introduction to Chemical Research) and provides graduate students in scientific disciplines the opportunity to mentor undergraduates in chemical research within a structured environment. Graduate students mentor mid level undergraduate students (enrolled in CHEM294) 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. Mentoring skills are an important part of professional training regardless of your future career path.

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: After successfully completing this course, students will:

- x Refine their understanding of the process of designing and executing a research project, including the process of proposal writing.
- x Develop and deliver a 4hr lecture on a topic of their choice with instructor support.
- x Receive formal mentoring training, including reflecting on their motivations for mentoring, articulating a mentoring philosophy, and examining

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- x Survey some tools and resources available for both mentors and mentees to facilitate clear communication and foster strong relationships
- x Gain experience with mentoring undergraduate students in developing an independent research project with the support of instructor and peers.

Instructional Methods: Students will each be assigned 3 undergraduate students (depending on enrollment in CHEM294 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 CHEM294



## Tentative Schedule

Date	Week	Task(s)		
		Lecture (M 2:15-3:15)	Lab (M 3:15-6:15)	Mentoring (TBD)
Jan 25	1	Introduction and course details	Class and mentor research introductions; 294: Undergraduate Experience Poll	
Feb 1	2	Introduction to the research process <a href="#">694: Lab rotations plan</a>	294: Safety training 694: Mentoring training	Intro to mentoring
Feb 8	3	Project funding	Lab rotations 1	Expectations and communication
Feb 15	4	Ethics & Keeping records 294: ID funding target & template <a href="#">694: Bring notebooks as example</a>	Lab rotations 2 294: Mentor preferences <a href="#">694: Bring Review Paper</a>	What is a mentor?
Feb 22	5	Surveying primary literature 294: Review article summary 294: Lab rotation feedback	Literature search 1 <a href="#">694: Lab rotations self reflection</a>	Scientific Ethics
Feb 29	6	Stating a testable hypothesis 294: Annotated Bibliography (3 articles)	Literature search 2	Challenging situations
Mar 7	7	Experimental design 294: updated Annotated Bibliography 294: Literature Review	Planning experiments1 <a href="#">694: brainstorming notes (after lab)</a>	Addressing problems
Mar 14-18		Spring Break		
Mar 21	8	Writing procedures 294: Project I dea <a href="#">694: Bring a procedure example</a>	Planning experiments2 <a href="#">694: Lit review feedback</a>	Diversity
Mar 28	9	Other proposal components 294: Research Project Plans 294: notes on funded proposal	294: Discussion with instructor <a href="#">694: Research Project Plan feedback</a>	Evaluating progress
Apr 4	10	What is science?	Experiments	Elements of good mentoring
Apr 11	11	Statistical analysis of data	Experiments	Helping students communicate
Apr 18	12	Ethics of scientific research 294: research proposal	Peer review and proposal revision <a href="#">294/ 694: peer review of proposal drafts</a>	Sharing philosophies
Apr 25	13	Science and society 294: Final proposal	Develop presentations	Teaching science