Chemistry 488: Undergraduate Chemistry and Biochemistry (2-3 Credits)
Spring Semester 2018

Instructor: Dr. Kriya L. Dunlap
Office: WRRB 230
Telephone: 474-2766 (office)
Email: kldunlap@alaska.edu

Meeting Time: TR 2:00 – 3:00, REIC 138
Office Hours: 1:00 – 2:00 T, WRRB 230 or by appointment
Safety Officer: Emily Reiter REIC 192 474-6748; eareiter@alaska.edu
Safety Training: All students must complete lab safety training with the Department Safety Officer Emily Reiter (see contact info above) prior to beginning work in any laboratory.

Pre/Co-requisites: CHEM325 or Chem 434 or Chem 314

Course Description:
This is a class for advanced research topics. The student will be required to be integrally involved in a research project that they will present at the end of the semester along with a final report. Research areas can range from atmospheric chemistry to molecular biology. A substantial level of chemistry or biochemistry background is assumed.

Getting Started:
Complete safety training.
Visit 3 professors and discuss possible projects.
Choose a project and obtain approval from a professor.
Get signatures from your new research mentor and Emily Reiter.
Write a project description (one-half page) and a summary of potential hazards.
Make copies of signature page and project description and turn in to my mailbox in REIC 194 or scan and send via email by **February 1st** due date!
Start working in your advisors lab.
Attend weekly meetings to report your progress (mandatory).

Course Goals:
This course is designed to enhance an undergraduate curriculum in chemistry by providing students with the opportunity to engage in research activities in the laboratories of UAF chemistry faculty member(s) or affiliates.

Learning Outcomes:
Students who complete this course will have a working knowledge of the scientific process, including hypothesis development, experimental design, use of instrumentation, data collection, and reporting. Students will write a formal, final report of their study, and present a poster summarizing their work at the end of the course.

American Chemical Society Definition of Undergraduate Research:
The ACS approves our programs and gives the following definition of undergraduate research: The research project should be envisioned as a component of a publication in a peer-reviewed journal. It should be well-defined, stand a reasonable chance of completion in the available time, apply and develop an understanding of in-depth concepts, use a variety of instrumentation, promote awareness of advanced

safety practices, and be grounded in the primary chemical literature. Research can satisfy up to four semester credit hours or six-quarter credit hours of the in-depth course requirement for student certification and can account for up to 180 of the required 400 laboratory hours. A student using research to meet the ACS certification requirements must prepare a well-written, comprehensive, and well-documented research report including safety considerations. Although oral presentations, poster presentations, and journal article co-authorship are valuable, they do not substitute for the student writing a comprehensive report.

Number of credits:
Credits are assigned when students enroll; however, the number of credits may be changed upon consultation with the professor. Two credits is the minimum requirement for a research project that involves experimentation. The usual requirement is 3 credits which corresponds to 9 hours (3 hours per credit) of productive work in the laboratory each week, plus ~ 2 hours outside of lab for planning, notebook writing, interpretation, and reading.

Finding a Project:
New 488 students and students who are seeking a new project/laboratory must meet with at least 3 faculty members (see form, attached) to discuss possible research projects before a mentor is selected. As you meet with faculty members, obtain their signatures on the form. Once you have selected a mentor, obtain their signature (bottom of same form), and work with your new mentor to write up a ½ page project description (include one journal reference) and summary of potential hazards on a second form (also attached). Submit a hard copy or a PDF of each form to Kriya Dunlap (REIC194 or kldunlap@alaska.edu). Please send a copy to your mentor as well. To learn about faculty research interests, go to http://www.uaf.edu/chem/faculty.

Continuing Students:
Students enrolled in 488 must turn in the ½ page project description each semester (include one journal reference). If procedures or materials have changed from the previous semester, also note that at the bottom of the page. This documentation is required to ensure that you and your mentor are aware of new hazards. Obtain signatures from your mentor and Emily Reiter, even if there are no substantive changes in procedures and materials.

Class participation/Weekly Meetings:
The purpose of these meetings is to discuss your progress and to discuss research related topics. You are expected to report significant progress each week, meaning, if you are taking the course for 3 credits, e.g., describe what you accomplished during the 10 hours in lab. If nothing worked, what did you try? What activities did you engage in while waiting for an automated procedure to run, etc. To allow for illness, travel, etc, you will be allowed to miss 3 meetings. For the remaining meetings, you must report significant progress (washing dishes doesn't count) to earn full credit for research participation. 4-5 absences will result in a letter grade reduction of your course grade (11 points). An additional half letter grade reduction (5 points) in your course grade will be deducted for each additional absence beyond 5 absences.

Report:
Each semester, a final written report in journal format is required. In other words, the format is that of a manuscript submitted to a peer-reviewed journal. Discuss the particular journal format you will follow with your mentor. You are advised to begin the writing process early, say mid-semester at the latest, at which point you should be able to write drafts of the introduction/background, methods, and perhaps

results. A PDF or hard copy of the final report is to be given to your mentor and instructor no later than **May 3rd.**

Poster:
Each semester, students must present a poster showcasing their work at the end of the semester. This will occur at the department end-semester potluck/poster session. If you are a continuing student, a new poster summarizing your most recent work (that of the current semester) is required. The usual size is 36" x 36", which will be printed with department funds. A larger size may be appropriate if the poster will be presented at a scientific meeting.

Grades:
The instructor in consultation with your mentor assigns your course grade. The grade is determined by class participation, the quality and quantity of the research completed, and the quality of your final report and poster. It is often beneficial to discuss grading with your mentor early in the semester to determine your mentor's expectations. A poster and research report are both required to receive a passing grade for the course. Course component grade breakdowns are as follows:

Participation	30pts
Poster	20pts
Research Report	30pts
Mentor/Project/Checkout Forms	20pts
Total	100pts

The grading scale is A – F, with no +/- designation. The cutoffs between A, B, C, D, and F are 90%, 80%, 70%, and 60%, respectively.

Attendance:
Attendance is mandatory. Students are expected to attend the weekly class meetings, and also to attend regular lab meetings with your research group. Also, discuss a regular work schedule with your mentor and maintain this schedule throughout the semester. Regular attendance in the lab and participation in lab group meetings are required.

Notebook:
A research notebook must be obtained from the Department of Chemistry & Biochemistry. Do not purchase/use your own. Keep complete notes of procedures, results, names and locations of relevant files stored on computer, etc, in your notebook. It is imperative that others are able to read your notes, so write legibly. You may take your notebook home, but it must be with you in lab and must ultimately remain in the lab at the end of the semester.

Digital Data:
Digital data (NMR spectra, e.g.) should contain cross-references to appropriate pages in your notebook. The digital data itself (e.g., IR or NMR spectra files, HyperChem files, and Excel files) should be left with your research mentor/lab.

Safety:
All students must complete safety training. This involves several online safety modules with quizzes and personalized training with Emily Reiter. You must contact Emily Reiter, the department's Safety Officer in 194A (474-6748) or at eareiter@alaska.edu to schedule your training. Schedule your training by February 1st. This training must be completed before you can begin work on your project.

Safety Tips:
Do not work alone. Wear safety glasses at all times, even if you are not conducting an experiment. Do not eat or drink in the lab. Do not perform a procedure if you are unsure of what you are doing or how the instrument works. Use common sense.

Mentor/Project/Checkout Forms:
At the beginning of the semester, you will need to complete and turn in the Mentor forms and Project description forms (pp. 5&6 of this document). At the end of the semester, students are required to complete a lab inspection checklist (pg 7) to ensure that chemicals are properly stored, glassware is clean and put away, etc. Complete the checklist with your mentor or with Emily Reiter and return it to me (Kriya Dunlap).

Computer access:
Currently Department of Computing and Communications (DCC) maintains two open labs on campus: the Bunnell Lab, and the Node (Rasmussen library). The Node has 24-hour access.

Support Services:
There are a large number of resources available to help students that may be having difficulty in the course or with a particular topic. I hold regular office hours. Students can also make an appointment to see me for help if office hours do not fit with the student's schedule. Additionally, chemistry department offers free tutoring services. Support can be obtained through the University of Alaska Library system, online resources. Additional services are available through Student Support Services (http://www.uaf.edu/sssp/) at UAF.

Disabilities Services:
We will work with the Office of Disabilities Services (http://www.uaf.edu/disability/) to provide accommodations for students with disabilities. If you have a disability and require special assistance, please inform me as soon as possible. Students with disabilities must provide documentation of the disability and a written statement indicating any special arrangements that need to be made.

Cheating/Academic Dishonesty:
The Chemistry & Biochemistry Department Policy on Cheating is: "Any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course." The Department considers performing unauthorized "dry labs" as cheating. Working with others in the lab is acceptable and encouraged but lab reports must show your own calculations and ideas.

Amending this Syllabus:
The instructor may make changes to this syllabus. Any changes will be clearly communicated via email sent to your UAF e-mail account and/or posted on Blackboard.

University of Alaska Fairbanks
Department of Chemistry and Biochemistry Undergraduate Research: Chem-488

Student Name:_____

UAF email address:_____ @ alaska.edu

Return this page with 3 or more signatures to me (Kriya Dunlap) via mailbox in REIC 194 or email (kldunlap@alaska.edu) by February 1st .

Faculty Mentor	Signature	Date
Kelly Drew		
Lawrence Duffy		
Kriya Dunlap		
Thomas Green		
Jenn Guerard		
William Howard		
Thomas Kuhn		
Jingqiu Mao		
Ryan Oliver		
Brian Rasley		
William Simpson		
Thomas Trainor		
Maegan Weltzin		

I have agreed to serve as research mentor for the above student. A brief description of the proposed research along with a statement of the associated, potential hazards is attached.

Date:_____ Mentor Signature:_____

Number of Credit Hours:_____ Mentor Printed Name:_____

The above student has completed his/her safety training and is approved to begin work on their research project.

Date:_____Emily Reiter: _____

University of Alaska Fairbanks
Department of Chemistry & Biochemistry Undergraduate Research, Chem-488

Name :_____ Semester : _____

Mentor : _____

Description of proposed research:

Lead-In Literature Reference:

Overview of planned laboratory procedures and materials, including a description of potentially hazardous procedures or materials:

488 Laboratory Check-Out List

Name :_____Mentor :_____

Check-out performed by: _____ on _____/ _____/ _____

Approved by PI:_____ on_____/_____ /_____

	Checked
Desk/office area cleared: books, files, personal items? Comments:	
Turned in lab notebook/CD with data files?	
Bench top/work area cleared? Comments:	
Chemicals or solutions remaining – clearly labeled? Comments:	
Samples or items in refrigerator or freezer in lab and/or in department? Comments:	
Waste bottles remaining? Comments:	
Dishes cleaned and returned? Comments:	
Fume hoods empty and clean? Comments:	
Equipment borrowed from stockroom or other labs? Returned? Comments:	
Chemicals borrowed or used up from stockroom or other labs? Comments:	
Gas cylinders returned to stockroom? Comments:	
Instruments cleaned and in good working order, no samples or waste remaining? Comments:	
Any damaged/defective/non-working equipment? List below.	
Notice any potential problems? Do you have comments or concerns? List below.	

Student Checklist for Chem 488

_____Mentor form (pg. 5 of syllabus) filled out and submitted via email by February 1st.

_____Project Description form (pg.6 of syllabus) submitted via email by February 15th.

_____2-5 page Project Summary Report Submitted via email by May 3rd.

_____PowerPoint Poster Printed and Presented by April 15th or at the Department potluck. Submit and electronic copy to me by April 19th.

_____Lab Check-Out form (pg. 8 of syllabus) filled out and submitted via email by May 3rd.