

# Environmental Chemistry Laboratory

## CHEM 4152, CRN# 33027

Course Syllabus, Spring 2021

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<b>Instructor:</b>	Dr. Kristin Dooley
<b>Office:</b>	Manion Hall 201C
<b>Phone:</b>	(501) 450-5940 (Forwarded to my cell)
<b>Email:</b>	<a href="mailto:kdooley@uca.edu">kdooley@uca.edu</a>
<b>Office Hours:</b>	T and R: 10:40-1:30 Other times by appointment
<b>Lab</b>	2:00-4:50 pm Manion 305
<b>Required Text</b>	None, we will print protocols to use for procedures
<b>Other Requirements</b>	See below

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**Course Description** Upper-division elective for chemistry majors and minors and a required course for those in the biology and chemistry tracks of the environmental science program. Uses a laboratory format emphasizing sampling, analysis, and data reduction techniques for multicomponent environmental samples.

**Prerequisite** A Pre- or co-requisite of CHEM 4351 (Environmental Chemistry).

**Course Objectives** The main goal of this course is to supplement your understanding of Environmental Chemistry through the use of analytical techniques and instrumentation that are common in environmental science testing. The student should leave the course with a basic understanding of sampling techniques and storage and handling procedures. We will focus on experiments with a local impact. Experiments will be quantitative in nature and use EPA protocols when available.

**Required Course Materials** **Communication** – You are responsible for material and announcements distributed through email and Blackboard.

**Eye Protection** - Approved (ANSI Z.87) laboratory eye protection should be worn at all times when chemicals or glassware is being used.

**Face Mask**—You will be required to wear a good-fitting face mask during lab times. The university provided KN-95 masks will be provided at our first meeting. If you feel that you need more, please let me know. There are more masks available for use, but they must be requested from the Physical Plant.

**Lab Notebook** – You will be responsible for collecting data in an organized manner. I recommend using a bound composition notebook, or similar for this. However, this is not required, and you may find that other methods (such as an iPad) work better for you.

**Calculator** – you need to bring a trusty calculator to each lab meeting.

**Appropriate Attire**

Although in general attire is dictated by lab safety measures, there will be times that you will collect samples outside of the lab. You should always plan ahead and have appropriate clothes/shoes as dictated by the conditions.

In lab, you are expected to wear closed-toed shoes. Shoes should cover the entire top of the foot and have hard-soles that are non-absorbent. Hair should never be worn loose. You should tie back as much as is possible to minimize accidents. Also in the lab, pants or skirts should cover the knee when you sit. If it does not, you should bring and wear a lab coat. Students may also prefer to wear a lab coat at every lab meeting as it offers added protection for you and your clothes.

You should make plans to wear outside appropriate clothing on days you will collect samples. Depending on the weather, you may want boots, hats, sunscreen, etc. Chemical safety is not as much of a concern here as is comfort and physical safety. Wearing appropriate clothing and footwear will help keep you on your feet if the terrain is slippery or muddy.

**Field Samples**

You will be expected to collect your own samples for testing in the lab. Although you will be doing this alone, you need to always follow proper safety guidelines while doing this. Not only should you keep lab safety in mind, you should also be mindful of common sense measures. A sample is not worth a physical injury. Field sampling will put you into contact with places and terrains that can be slippery or pose other dangers. DO NOT risk life and limb to collect a sample! Also, make sure that you have permission to collect a sample BEFORE sampling.

**Grading**

Your grade in this lab will be based on your grades on each of the assignments you turn in throughout the semester. Each assignment will carry the same weight for your overall grade calculation. The number of labs that we complete will vary depending on the length of each procedure, but you should expect about 7-10 reports/assignments throughout the semester.

**Lab Safety**

**You must complete the lab safety agreement BEFORE you will be allowed to work in the lab.**

**You must follow all lab safety guidelines, or you will be asked to leave the lab and credit will not be given for the work missed.**

**General Lab Instructions**

Lab experiments will be carried out individually. They may span one or more weeks depending on the complexity of the experiment.

Occasionally, there will be times when sample preparation or analysis requires strict adherence to a timeline. Leaving a sample for too long may ruin the analysis, and some samples have short use-by dates. For this reason, you will need to be willing to complete a lab experiment outside of the scheduled lab times. You will be able to access your samples 8:00 am to 4:00 pm on weekdays. You will need to schedule a time with me so that I can supervise your time in the lab.

Lab Reports and other assignments will be due one week after the experiment is completed.

They are expected to be typed and well-organized.

## Lab Reports

Informal reports will focus on data manipulation and results. A good report will usually include the following sections:

- Introduction:
  - highlights the goal of the experiment
  - Does not need to have references
  - Simply talk about what you set out to do and mention the technique used to accomplish this.
- Procedure:
  - give a brief summary of the procedure used (step by step or paragraph form is acceptable)
  - include the reference to the published procedure if applicable
- Data
  - Include a table of raw values.
  - So, if you have several runs or measurements of the same sample, give each here.
  - You do not have to give masses of reagents used to make stock solutions, but provide exact molarities for those solutions.
  - In general, if you use that number to calculate anything, add it to the data table/section
- Results
  - I anticipate this to be the most detailed section of the report.
  - Explain how (you don't have to show sample calculations) you calculated the numbers you get here from the data values.
  - This is the place to show graphs.
  - Show equations if they aren't completely obvious (like molarity) For example, if you use a best fit line, explain that you used it and plugged in the absorbance of your unknown sample to solve for the concentration.
  - BE MINDFUL OF SIG FIGS!
- Error Analysis
  - In a separate section (often short section!), show or explain what you did for error analysis. Where did you get your confidence intervals for the reported findings?
- Conclusions
  - There is little need for a long discussion section for us, so use the conclusions to summarize your data. (as in, "I set out to measure..... I found that the concentration of Fe in the sample was\_\_\_\_\_")
  - Don't forget to include error bars!
  - Use this to explain if that is a large value for a measurement or if the value that you found was typical.
  - If needed, explain what went terribly wrong.

## University Policies

Americans with Disabilities Act	The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Office of Disability Support Services, 450-3613.
Academic Integrity	The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.
Course Evaluations	Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate courses they are taking starting on the Monday of the twelfth week of instruction through the end of finals week by logging in to myUCA and clicking on the Evals button on the top right.
Emergency Procedures	An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <a href="http://uca.edu/mysafety/bep/">http://uca.edu/mysafety/bep/</a> . Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.
Title IX Disclosure	If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <a href="https://uca.edu/titleix">https://uca.edu/titleix</a> . *Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.
Other Policies	Students are encouraged to familiarize themselves with all policies included in the Student Handbook, particularly the Sexual Harassment Policy, and all Academic Policies.