

# CHEN 4810: Biological Engineering Lab

Department of Chemical and Biological Engineering  
University of Colorado  
Fall 2024\*

## Course Learning Goals:

1. Review of selected topics in thermodynamics, heat transfer, fluid mechanics, biological separations, and biokinetics.
2. Application of statistical analysis to experimental data.
3. Experience working in a simulated industrial environment on “teams”.
4. Improvement of written communication and interpretation of experimental results.

## Instructor

Melissa Mahoney (Teaching Professor)  
melissa.mahoney@colorado.edu

## Office Hours:

You are free to ask questions in person during our laboratory period once all experiments are underway. The best time to ask questions would be between 2:00 and 3:00. I will also hold Virtual Office Hours (using the zoom link below) on Mondays between 2:00 and 2:45.

## [Professor Mahoney's Virtual Office](#)

Zoom Meeting ID: 944 704 3674

Zoom Passcode: 905155

## Teaching Assistants

Your teaching assistant will primarily be responsible for preparing solutions and reagents for the different experiments. They will also grade electronic lab notebooks and pre-lab assignments. If you have questions about grading of these items please direct questions to your TAs. Specific questions about each experiment or data analysis are best directed to Professor Mahoney.

## Advanced Teaching Assistant

aitana.ignés-romeu@colorado.edu

## General Format of the Course

You will work on experiments in groups of 3 - 4 according to the schedule posted on the course website. For each experiment your group will need to complete the pre-laboratory assignment. This assignment will require you to do some research on the equipment and techniques that are used to collect experimental data. Some of the questions will require you to develop a plan for using experimental data to calculate various parameters. Once the pre-lab experiment has been successfully completed, teams will spend two or three laboratory sessions collecting experimental data. The data will be analyzed and turned in as a Key Results Assignment. You will be given feedback on your Key Results Assignment and this should be incorporated into a final Technical Memo. Guidelines and due dates for each of these assignments can be found on the course website.

In addition to our work in the lab, we will have Virtual Group Meetings a couple of times over the course of the semester. The schedule for these meetings is posted on the course website. These meetings will give your group an opportunity to ask questions about experiments, data, or feedback on assignments. I expect all group members to attend Virtual Group Meetings. You are also required to meet with your group regularly (weekly is suggested) to discuss and complete data analysis and assignments.

### Course Website

The link to the course website is provided in Canvas. Students enrolled in the course will be able to find pertinent information related to the course, including experiment descriptions, expectations, and a variety of tutorials and information related to, among others, how to put together written reports, how to create scientific figures, the fundamentals of error analysis, and more. There is no official textbook that is required for this course.

### Assignments and Grading Basis

Please see the Course Schedule posted on the Course Website or Canvas for a list of due dates and points per assignment. Many, if not all, assignments will be turned in through Canvas. *Turn your assignments in on time or you will be heavily penalized!!!*

Assignments turned in late will be counted for 50% of possible points for 24 hours after the due date/time. No credit will be given for assignments turned in 24 hours past the due date.

Tutorial Assignment (Individual)	1 x 10 pts	10
Pre-laboratory Assignment		
Pre-lab Experiments 1 - 4 (Individual)	4 exp x 40 pts	160
Design of Experiment Plan for 1 - 4 (Group)	4 exp x 10 pts	40
Key Results Assignment		
Key Results Experiments 1 - 4 (Group)	4 exp x 50 pts	200
Technical Memos		
Experiments 1 - 3 (Group)	3 x 60 pts	180
Experiment 4 (Individual)	1 x 70 pts	70
Memo Peer Feedback (Individual)	3 x 5 pts	15
Team Member Evaluations		
Peer assessment per experiment	3 x 10 pts	30
Final peer assessment for semester	1 x 60 pts	60
Student Evaluation by Instructor/TA		
Instructor assessment at semester end		125
Electronic Lab Notebook Checks	4 checks x 25 pts	100
Safety Training	2 courses x 5 points	10
Total points in the course		1000 points

### Letter Grades

Letter grades will be assigned according to the curve below. The instructor does reserve the right to lower the score required for a letter grade. +/- grades will be assigned at the upper and lower end of the numerical ranges.

90-100      A  
80-90        B

65-80	C
50-65	D
<50	F

### **Attendance**

Each group member is expected to attend each laboratory session. There are no opportunities to make-up a missed laboratory session. If you are ill please email Professor Mahoney as soon as possible (ideally prior to lab) to alert me of your illness-related absence. If you must be absent from the lab because you are ill, and you have notified Professor Mahoney in advance of the absence, there will be a written assignment that you will need to complete in order to receive credit for the missed lab session. You will also need to develop a plan with your group for staying informed about the progress that was made during the laboratory session that you missed. You will need to communicate the plan to your group and your instructor by email.

In addition to regular laboratory meetings, you are also expected to meet with your group on a regular basis to discuss and/or work on assignments for this course outside of class meeting time. You must make time in your schedule to attend your group meetings. If, for any reason, you or any member of your group is unable to do this you need to schedule a meeting with me as soon as possible to discuss.

**There is a 10% reduction in the final course grade for every unexcused absence from the lab. Prompt attendance is critical to your success in this course.**

### **Classroom Behavior**

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

For more information, see the [classroom behavior policy](#), the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

### **Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation**

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

If you have a temporary medical condition or required medical isolation for which you require accommodation, please notify your instructor within 24 hours of the incident. Your instructor will work with you to develop a plan for meeting both the needs of the course and your own needs. Please also see [Temporary Medical Conditions](#) on the Disability Services website.

### **Preferred Student Names and Pronouns**

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

## **Honor Code**

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code. For a specific description of the rules associated with ChatGPT use in this course, please see [this document](#).

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: [StudentConduct@colorado.edu](mailto:StudentConduct@colorado.edu). Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

## **Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation**

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about university policies, [reporting options](#), and [support resources](#) including confidential services can be found on the [OIEC website](#).

Please know that faculty and graduate instructors must inform OIEC when they are made aware of incidents related to these policies regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about resolution options and support resources. To learn more about reporting and support for a variety of concerns, visit the [Don't Ignore It page](#).

## **Religious Accommodations**

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, please email me to notify me at least 24 hours in advance of the conflict. We will work out a plan for making up missed obligations.

See the [campus policy regarding religious observances](#) for full details.

**Mental Health and Wellness**

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through [Academic Live Care](#). The [Academic Live Care](#) site also provides information about additional wellness services on campus that are available to students.