

BIEN 4810: Biological Engineering Lab

**Department of Chemical and Biological Engineering
University of Colorado
Fall 2025**

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 and oral communication and interpretation of experimental data.

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 is between 2:30 and 5:00. I will also hold hybrid office hours on Mondays from 2:00 - 3:00 in the lab. On Thursdays I will hold Virtual Office Hours from 2:30 - 4:00 (using the zoom link below).

Mondays 2:00 - 3:00 (Hybrid: Online/In lab)
Thursdays 2:30 - 4:00 (Online)

[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 please direct questions to your TAs. Specific questions about each experiment or data analysis are best directed to Professor Mahoney.

Teaching Assistant

siddhi.bhirud@colorado.edu

General Format of the Course

You will work on experiments in groups of 3 according to the schedule posted on the course website. For each experiment you 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 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 deliverable. In some cases that final deliverable will be an oral presentation and in other cases it will be a written assignment or a lab practicum. Guidelines and due dates for each of these assignments can be found in Canvas.

In addition to our work in the lab, we will have Virtual Group Meetings a couple of times over the course of the semester. 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.

Canvas Site

Within Canvas, students enrolled in the course will be able to find pertinent information, including experiment descriptions, expectations, and a variety of tutorials and information related to, among others, how to create scientific figures, the fundamentals of error analysis, and more. There is no official textbook that is required for this course, however, there are several suggested online references provided for each experiment.

Assignments and Grading Basis

Please see the Course Schedule in Canvas for a list of due dates and points per assignment. *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.

Safety Training	2 courses x 5 points	10
Tutorial Assignment (Individual)	1 x 15 pts	15
Expectations Assignment (Individual)	1 x 15 pts	15
Pre-laboratory Assignments		
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
Final Deliverables		
Experiment 1 Critique	50 pts	50
Experiment 2/3 Presentation/Writing Session	2 x 75 pts	150
Lab Practicum (Individual)	1 x 100 pts	100
Team Member Evaluations		
Peer assessment per experiment	4 x 15 pts	60
Final peer assessment for semester	1 x 40 pts	40
Student Evaluation by Instructor/TA		
Instructor assessment at semester end		120
Electronic Lab Notebook Checks	4 checks x 10 pts	40
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 assessment 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.

Additional classroom behavior information

- [Student Classroom and Course-Related Behavior Policy.](#)
- [Student Code of Conduct.](#)
- [Office of Institutional Equity and Compliance.](#)
- [Student Code of Conduct.](#)

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 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 adjustment, please notify me within 24 hours of the incident. I will work with you to develop a plan for meeting both the needs of the course and your own needs.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the [Registrar's website](#) for instructions on how to change your personal information in university systems.

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 of adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will 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 OIEC@colorado.edu. Information about university policies, [reporting options](#), and [OIEC support resources](#) including confidential services can be found on the [OIEC website](#).

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support 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 [AcademicLiveCare](#). The [AcademicLiveCare](#) site also provides information about additional wellness services on campus that are available to students.

[Acceptable Use of AI in This Class](#)