

CHEN 4810: Biological Engineering Lab

Department of Chemical and Biological Engineering
University of Colorado
Spring 2021

Course Learning Goals

1. Review heat transfer, fluid mechanics, biological separations, recombinant protein production and cell growth kinetics in bioreactors.
2. Application of statistical analysis to experimental data.
3. Experience working in a simulated industrial environment on “teams”.
4. Improvement of written communication of interpretation of experimental results.

Instructor

Melissa Mahoney (Instructor)

melissa.mahoney@colorado.edu

Join me in my "Virtual Office" via Zoom:

<https://cuboulder.zoom.us/j/9447043674?pwd=d2l1bUkxNnNoTmt6N041UkZ0L2h6dz09>

Meeting ID: 944 704 3674

Passcode: 905155

[Click Here for Professor Mahoney's Office Hour Schedule](#)

Teaching Assistants

Zoe.Davis-1@colorado.edu

Zoe specializes in the Chromatography Experiment

Hannah.Middlestead@colorado.edu

Hannah specializes in the GFP Experiment

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 posted in Canvas. The pre-lab assignment will require you to do some research to collect background information on the equipment and techniques that were used to collect experimental data. You will also need to develop a calculation flow chart for theoretical calculations pertaining to the experiment (*Hint: Do not wait until the last minute to begin your pre-lab assignment*). Your group will meet with Professor Mahoney or your TA to answer any questions that you may have pertaining to the pre-laboratory assignment prior to turning it in. Once your pre-lab assignment is complete, you will receive a set of

experimental data that your group needs to analyze according to the instructions outlined in the “Key Results” assignment. You will receive feedback on your Key Results assignment and then a written report (partial or full) will be written. Guidelines for each of these assignments can be found on the course website.

We will not meet live as a whole class this semester. Instead, you will have group meetings with Professor Mahoney or your TA every couple of weeks according to the [course schedule](#). These meetings will give your group an opportunity to ask questions about experiments, data, or feedback on assignments. In addition to these meetings it is expected that your group meets weekly to discuss and complete data analysis and assignments.

Canvas Site

The course has a site in Canvas. All assignments will be submitted electronically via Canvas. There is also a link to the course website posted 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 Assignment Schedule in 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.

Pre-laboratory Assignment		
Pre-lab Experiments 1 - 3	3 exp x 50 pts	150
Key Results Assignment		
Key Results Experiments 1 - 3	3 exp x 50 pts	150
Group Written Reports		
Partial Group Written Report Experiment 1	Exp. 1 x 100 pts	100
Group Written Report Experiment 2	Exp. 2 x 125 pts	125
Individual Written Report Experiment 3	Exp. 3 x 150 pts	150
Team Member Evaluation		
Peer assessment at semester end		100
Student Evaluation by Instructor/TA		
Instructor assessment at semester end		100
Total points in the course		875 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

While we will not meet regularly as a class this semester, you are required to meet with your group on a regular basis to discuss and/or work on assignments for this course. You must make time in your schedule to attend your group meetings. If, for any reason, you are unable to do this you need to schedule a meeting with Professor Mahoney as soon as possible to discuss. Your grade is in part dependent on showing up for group meetings.

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail 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, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

Requirements for COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert [CU Boulder Medical Services](#).

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more

information, see the policies on [COVID-19 Health and Safety](#) and [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the “Accommodation for Disabilities” statement on this syllabus.

All students who are new to campus must complete the [COVID-19 Student Health and Expectations Course](#). Before coming to campus each day, all students are required to complete the [Buff Pass](#).

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home. In this class, if you are sick or quarantined, please let me know by email and we will work together to address any work that needs to be completed.

Accommodation for Disabilities

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.

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 policy may include: plagiarism, 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. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct

or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please send me an email to let me know of any conflicts and we will work together to address the situation. ,

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