BIEN 2810 Biology for Engineers
JSCBB A108
Class: MWF 11:45am-12:35pm
Spring 2026

INSTRUCTOR: Laurel Hind
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OFFICE HOURS: TBD

REQUIRED MATERIALS:

- **COURSE TEXT**: *Biology, 13th Edition* Raven, Johnson, Mason, Losos and Duncan. As a student enrolled in CHEN 2810, you will automatically be enrolled in Inclusive Access, which gives you access to the online textbook (ebook) and McGraw-Hill Connect.
- **CLICKER**: During each class, I will have several Clicker questions (see below for detailed information). Participation during class is mandatory, comprising of 10% of your final grade in the course.

COURSE DESCRIPTION
The purpose of this course is to develop a basic understanding of the science of biology. Particular emphasis will be placed on topics of potential importance and significance to chemical and biological engineers. This basic understanding will provide a solid foundation for subsequent courses related to biological and biomedical engineering.

COURSE OBJECTIVES/LEARNING OUTCOMES
Upon completion of this course, you will have an introductory understanding of the following biological areas:

- *Biochemistry: the molecular structure of proteins, carbohydrates, and nucleic acids*
- *Cell organization*
- *Metabolism*
- *Genetics*
- *Molecular Biology*
- *Recombinant DNA Technology*
- *Evolution and Natural Selection*
- *Special Topics (Tissue Engineering, Immunology)*

Course Format
Biology, the science of living things, is one of the most complex and quickly evolving science disciplines. It begins with biochemistry, the molecular basis of life, and extends to population dynamics and covers everything from cells to tissues to organ systems to organisms to populations. There is simply not enough time to cover everything in one semester, therefore, we will only cover the most basic processes and highlight new advances. We will use a mix of textbook reading, classical lectures, in-class activities, and project based assessements to learn these concepts and develop a deeper understanding of the connections between the topics we cover.

Much of what you will learn in this course you will do so through the reading of the textbook. There is not enough time during class meetings to cover everything in the text. *Class meetings should be thought of as reinforcement*

the reading. During class, I will emphasize the important and/or confusing concepts and expand upon concepts in the book as well as present interesting topics that are not in the book. As such, reading is of utmost importance and class attendance is crucial. You will be expected to have read the assigned reading for each class period prior to coming to class. Prior to each class, you must complete the McGraw-Hill Connect Reading Assignments. During class, you'll be expected to interact with/answer several Clicker questions (an integral part of your final grade). Projects, in-class activities, and exams will test your understanding of the material.

Classroom Expectations

You will get the most out of this class if you are present and engaged. Active learning and class discussion are a part of the course design, and we will use iClicker to gauge understanding throughout the course. Research repeatedly shows that being prepared for an engaged in class significantly improves your learning; therefore, I have designed the course to encourage you to complete the pre-class readings ahead of time.

There will be opportunities to work with your peers in the classroom during in-class activities and to disucss your ideas during iClicker questions. However, to maintain a respectful and positive learning environment for everyone I ask that you do not engage in conversations or use technology including cell phones, laptops, or headphones for non-course related activities during lecutres. These can be distracting to your peers and to your own learning.

Course Website: The course website is available on Canvas (canvas.colorado.edu). The website will be invaluable for this course and I will be using it extensively to post announcements, slides from class, important documents and links, and updated grades throughout the semester.

Email: *Email has been deemed by the University of Colorado as an official method of communication*. Please make sure you are having your Colorado.edu email forwarded to your main email if you do not use Colorado.edu email. Anything I announce via email is official. This may include things such as changes to the syllabus and other important course announcements. We will utilize a class email for this course, please direct all communication to the course email.

How to Succeed in This Course

Biology is a complex subject for many reasons: there are lots of details, our knowledge is constantly evolving, and everything is connected. What you learn about hydrogen bonding will be critical for your understanding of protein structure which directly influences protein function, cellular organization, and tissue function. This level of interconnectedness means that changes in a protein that lead to changes in hydrogen bonding could ultimately alter natural selection. What this means for the course is that the content builds on itself so staying up to date is critical and making sure you are understanding the material is key because we will regularly ask about how aspects of what we are learning are connected. Memorizing facts will not earn you an A, I expect you to syntheize concepts and ideas across lectures and apply your knowledge. What should you do:

- Read prior to class and come to lecture prepared to answer questions
- Take notes in class and ask questions!
- Review the material after every lecture and attend office hours to review concepts you find challenging
- Start the projects early so you have plenty of time to think and ask questions
- Study for exams throughout the semester, not just the weekend or evening before and utilize the tools provided

METHODS OF EVALUATION

Reading Assignments in McGraw-Hill Connect (15%): For almost every class period, you will be responsible for completing a Reading Assignment in McGraw-Hill Connect. You will read sections of the book and then be asked questions about those sections. McGraw-Hill Connect will adapt to your strengths and weaknesses and focus on the material that you need to learn. Links to the Reading Assignments can be found on Canvas through the McGraw Hill Connect tab.

Each student is expected to do these Reading Assignments *independently* with no help from other students, and they will be relatively easy if you read the assigned material. Reading Assignments must be completed and submitted by 11:45am the day of class. They will generally be available on the course website a week before they are due.

Instructions outlining how to register for McGraw-Hill Connect and Inclusive Access (online textbook) will be provided early in the semester.

Classroom Participation (10%): This will primarily be clicker questions but may encompass other activities throughout the semester. We will be using iClicker to enhance active learning and participation in the course. Our classroom (BIOT A108) has limited wifi capabilities; therefore, I recommend you purchase and use an iClicker +. If you choose to use the iClicker app on your phone or tablet, keep in mind that you may experience connection issues, and I cannot be held responsible for any points lost due to this fact. You will need to have an iClicker student app account, register your clicker there (https://buffportal.colorado.edu/card/cuclicker), and download and set up the app BEFORE you get to class. Students MUST click in person themselves in A108 in order to receive clicker points; having someone else click in for you is considered cheating and academic misconduct.

Each question will be worth two points: one point for answering and one point for getting the correct answer. The lowest 4 scores will be dropped to provide up to 4 absences, no questions asked. These absences cover illnesses, travel, or missing class for any other reason.

In-Class Activity Days (5%): We will have 3 lecture periods devoted to in-class group activites. These scenarios are designed to apply what you are learning to real world scenarios. You need to be present to participate in these group activites. There will be pre-activity and post-activity assignments that need to be completed before and after class and will be included in your grade. The top two scores will be used for your final grade, so if you miss one class period that score will not count.

Projects (15%): There will be two short projects due during the semester. These projects are designed to show a deeper understanding of material covered in lectures, in class activities, and exams. More details will be provided later in the semester.

Exams (30%): There are 3 midterm exams in addition to the Final Exam. These exams will be taken during class time (maximum of 50 minutes). Exams are cumulative (everything since day 1 is fair game) and will be given on the following days during class: 2/6, 3,6 and 4/10. If you have an accommodation letter that provides you extra time on exams, you will take your exams in the testing center.

Final Exam (25%): The Final Exam will be a cumulative evaluation of each student's knowledge of the subject material. The Final Exam will be given during the normal final exam scheduled time for this course: Sunday May 4th from 7:30-10pm.

Late Work
All assignments close at the stated times; no late work will be accepted except in the case of a documented emergency or medical situation. If you are having difficulties, please let the instructors know before due dates so we can work out a solution together.

GRADING

Methods of Evaluation	**Percentage of Final Grade**
Reading Assignments in McGraw-Hill Connect	15%
Classroom Participation	10%
In Class Activities	5% (top 2 scores used)
Projects (2)	15%
Exams (3 of these)	30% (10% for each exam)
Final Exam (cumulative)	25%

GRADE ASSIGNMENTS

A curved grading scale promotes competition among students and hinders learning. Therefore, I will be using a fixed grading scale for the class (see below). Each of the components of your final grade, as well as the final course grade will be determined based on the following general rubric.

Letter Grade	Percentage Grade	Description
A	$93 \leq score \leq 100$	Exceeds all required elements of an assignment, and the quality of the work is considerably greater than what was required. The quality of the work is considerably above the class average and impressive to the evaluator.
A-	$90 \leq score < 92.99$	
B+	$87 \leq score < 89.99$	Meets all required elements of an assignment, and the quality of the work is better than what is required and demonstrated by the class average.
B	$83 \leq score < 86.99$	
B-	$80 \leq score < 82.99$	
C+	$77 \leq score < 79.99$	Meets all required elements of an assignment, no more, no less. Quality of assignment is satisfactory for college level work.
C	$73 \leq score < 76.99$	
C-	$70 \leq score < 72.99$	
D+	$67 \leq score < 69.99$	Fails to meet all required elements of an assignment, and/or the quality of the assignment is less than satisfactory.
D	$63 \leq score < 66.99$	
D-	$60 \leq score < 62.99$	
F	Less than 60	Only meets some of the required elements of an assignment, and/or the quality of the assignment is considerably lower than satisfactory. 50% of points are not guaranteed. At this level points are only given if some elements of the assignment are met. If not, very low percentages are likely.
Zero	0	Fails to meet any of the required elements of an assignment, and/or the quality of the assignment is well below basic standards of writing, comprehension, and/or ability to follow instructions; assignment is late or incomplete; assignment is not turned in at all; assignment shows signs of plagiarism or other forms of academic dishonesty.

COURSE COMMUNICATION

All class slides, assignemnts, and videos will be placed on Canvas for students to download.

UNIVERSITY POLICIES

University Policies can be found here and below.

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.

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 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.

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 illness, injury or required medical isolation for which you require adjustment, please email Dr. Hind.

Accommodation for Religious Obligations
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 Dr. Hind within the first week of class. See the campus policy regarding religious observances for full details.

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.

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.

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. 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 that individuals impacted receive outreach from OIEC about their options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

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.

Acceptable Use of AI in this Class

Generative artificial intelligence tools—software that reproduces text, images, computer code, audio, video, and other content—have become widely available. Well-known examples include ChatGPT for text and DALL•E for images. This statement governs all such tools, including those released during our semester together. Keep in mind that the goal of gen AI tools is to reproduce content that seems to have been produced by a human, not to produce accurate or reliable content; therefore, relying on a gen AI tool may result in your submission of inaccurate content. It is your responsibility—not the tool's—to assure the quality, integrity, and accuracy of work you submit in any college course. If gen AI tool use is suspected in completing assignments for this course in ways not explicitly authorized, I will follow up with you. I may contact the Office of Student Conduct & Conflict Resolution to report suspected Honor Code violations. In addition, you must be wary of unintentional plagiarism or data fabrication. Please act with integrity, for the sake of both your personal character and your academic record.

Limited Gen AI Use: You may NOT use gen AI tools on most assignments in this course including reading assignments, clicker questions, or exams. You MAY use gen AI tools in a limited capacity for the projects. They may be used for generating ideas or outlines and for spelling and grammar checks. They **MAY NOT** be used for writing or rewriting sections of the project, generating images, or finding citations. The final work must be student-geerated with proper critical evaluation and original analysis as outlined in the project guidelines. If you use gen AI tools in this class, document your usage with the Chicago Manual of Style or appropriate citation guidelines for this course.

BIEN 2810 SCHEDULE – SPRING 2026 (SUBJECT TO CHANGE)

Week	Monday	Wednesday	Friday
#1 1/5- 1/9			1: Intro; Syllabus
#2 1/12- 1/16	2: Biology and The Scientific Method Ch. 1	3: Nature of Molecules and Water Ch. 2.1-2.6	4: Carbon + Carbohydrates Ch. 3.1-3.2
#3 1/19- 1/23	MLK DAY (NO CLASS)	5: Nucleic Acids + Proteins Ch. 3.3-3.4	6: Proteins + Lipids Ch. 3.5
#4 1/26- 1/30	7: Cells I Ch. 4.1-4.5	8: Cells II Ch. 4.6-4.8	9: Membranes I Ch. 5.1-5.3
#5 2/2- 2/6	10: Membranes II Ch. 5.4-5.6	**11: Class Activity**	**12: EXAM**
#6 2/9- 2/13	13: Metabolism I Ch. 6.1-6.3	14: Metabolism II Ch. 6.4-6.5	15: Cellular Respiration I Ch. 7.1-7.3
#7 2/16- 2/20	16: Cellular Respiration II Ch. 7.4-7.6	17: Cellular Respiration III Ch. 7.7-7.8	18: Cell Communication I Ch. 9.1-9.3 **Project 1 Due**
#8 2/23- 2/27	19: Cell Communication II Ch. 9.4-9.5	20: Cell Division I Ch. 10.1-10.3	21: Cell Division II Ch. 10.4-10.7
#9 3/2- 3/6	22: Meiosis and Sexual Reproduction Ch. 11	**23: Class Activity**	**24: EXAM**
#10 3/9- 3/13	25: Inheritance I Ch. 12	26: Inheritance II Ch. 13.1-13.2	27: Inheritance III Ch. 13.3-13.5
#11 3/16- 3/20	Spring Break – No Class	Spring Break – No Class	Spring Break – No Class
#12 3/23- 3/27	28: DNA Ch. 14	29: Gene Expression I Ch. 15.1-15.3	30: Gene Expression II Ch. 15.4-15.8
#13 3/30- 4/3	31: Gene Expression III Ch. 16.1-16.4	32: Control of Gene Expression Ch. 16.5-16.7	33: Biotechnology and Genomics I Ch. 17.1-17.4
#14 4/6- 4/10	34: Biotechnology and Genomics II Ch. 17.5-17.7	**35: Class Activity**	**36: EXAM**
#15 4/13- 4/17	37: Evolution I Ch. 20	38: Evolution II Ch. 21	49: Origin of Species II Ch. 22 **Project 2 Due**
#16 4/20- 4/24	40: Immunology Ch. 50.1-50.2	41: Vaccines	42, Review for Final Exam
	Final Exam		