

Colorado State University Department of Biochemistry and Molecular Biology
BC 351-801 Principles of Biochemistry

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Office Hours: Wednesday 1-3 PM or by appointment via MS Teams

Your Email: The email account I will send email messages to will be the one you have currently registered with Colorado State University. If you have not received an email from me by the 1st day of the class you are likely not checking the correct account. If you don't know what email account you should check please visit this [webpage](#).

Prerequisites: 1 semester of Organic Chemistry and 1 semester of College Biology – PLEASE CONTACT ME IF YOU DON'T HAVE AT LEAST THESE COURSES AND YOU ARE ENROLLED IN THIS COURSE.

Textbook: The course materials are available through the CSU Inclusive Access Program. These materials include online homework, quizzes and/or access to the eBook. The access is **REQUIRED** for this class, so you can utilize the bookstore program or you must find it on your own. Please watch for emails from the “CSU Bookstore” about ‘opting out’ as well as charges to your student account. These emails will be sent to your official “@colostate.edu” address. You can manage all these materials by clicking on “**Manage eResources**” in Canvas after clicking on our class.

Learning goals: Principles of Biochemistry is designed to introduce you to major topics in the field of biochemistry. The class is broken into three major units: Structural Biology, Protein Function, and Metabolism. In the first unit we will focus exclusively on chemical concepts and protein structure. In the 2nd unit we will focus on enzymology, ligand binding, and membrane transport. The final unit will focus on carbohydrate metabolism and cellular respiration. A complete list of Learning objectives will be placed on Canvas. Students will be strongly encouraged throughout the semester to read and understand these objectives. Below are the learning goals for the semester:

Upon completion of BC351 students will...

1. *Understand the chemical properties of the molecular components of living organisms and the physical basis for interactions within and between these molecules.*
2. *Understand the physical driving forces operating in biochemical processes of living organisms.*

3. *Understand the dynamic and regulatory nature of biochemical pathways needed to maintain biological steady states.*

Canvas: All course material will be presented via Canvas. Here are a couple of links to help you get familiar with Canvas:

1. [Login page:](#)
 - a. You will need an eID and password to login. If you don't have one of these you can get it from this [website](#). Simply click on "Your CSU eID".
2. Getting Started in Canvas:
 - a. Here is a link to a [Canvas student resource page](#) that will help introduce you to Canvas and how to best use it along with other information.
3. In Canvas you will find the following:
 - a. Course home page
 - i. When you login to this course this will be the default page.
 - b. Announcement
 - i. I will make weekly "announcements" regarding what is due for that particular week.
 - ii. I will also use this page to update you on the "happenings" in the course.
 - c. Modules:
 - i. There are a number of modules in this class. The 1st module is the syllabus module that contains the "Start here" page. If you haven't already please go to this page and work your way through the first 6-steps for this class.
 - ii. There are 14 modules that correspond directly to a chapter within the book. In each of these modules you will find:
 1. A PowerPoint file for the module's set of lectures.
 2. A set of extra credit discussion questions.
 - iii. Four exam study materials modules that contain:
 1. Study guides, practice exams, and learning objectives. They are found immediately following the last chapter for that particular exam.
 - d. Assignments:
 - i. This is where your exams will be found.
 - ii. Remember that your **quizzes and other assignments** will be found **in the book**.
 - e. Grades
 - i. I will report the grades on all your assignments in this tool as well as your final grade.
 - f. People
 - i. A list of all your fellow students

g. Echo360

- i. This page will take you to recordings of each day's lecture.

Attendance: "Attendance" to every class is strongly encouraged and will be a determining factor for your success in this class. Attendance in the online course is simply done by listening to each lecture recording in Echo360 and responding to the pollweverywhere question for the day by filling out the discussion forum. You will be held accountable for all material presented in these recordings.

SDC arrangements: If you are a student who will need accommodations in this class due to a disability or chronic health condition, please provide me the SDC accommodation letter. If you do not already have these accommodation letters, please contact the SDC as soon as possible to initiate the process of setting up accommodations. The SDC is located in room 121 of the TILT building. You can reach them by phone at 970-491-6385 or visit www.disabilitycenter.colostate.edu

Assignments: This class consists of 14-chapter quizzes (5 points each), 4 exams (100 points each), 14 metacognition questions (15 points total), 2 drag-n-drop assignment (30 points), 1 worksheet assignment and accompanying quiz (10 points), 2 structural tutorials and accompanying quiz as detailed below:

1. Chapter Quizzes – 70 points
 - a. These will be presented through the book. There will be a total of 14 quizzes equaling 70 points. You will have two opportunities to take the quizzes. Your highest score of the two attempts will be recorded. Due dates for the final attempt on each quiz are listed on the schedule.
2. Summary/Reflection Questions- 14 points
 - a. These will be presented in the book in the "Summary/Reflection" tab. Each chapter will have a single question worth 1 point each. There are no "right" or "wrong" answers for these questions, BUT you will need to do them and take them seriously to receive credit for them. Due dates for each question are listed on the schedule.
3. Glycolysis and Citric Acid Cycle Drag-n-drop assignment – 15 points
 - a. These assignments will be presented in the book in Chapter 11 and 12. In class discussion will follow. As the time approaches, I will be giving more information about this.
4. Work sheet assignment – 10 points
 - a. This assignment will be done in Chapter 8 and will consist of two parts: 1. A pre-quiz (taken by each individual student) and 2. An "in-class" worksheet. As the time approaches, I will be giving more information about this.

5. Structural tutorials – 30 points
 - a. These assignments will be presented in the book with accompanying quizzes for chapters 4 and 5 material. “In class” discussion will follow on echo360. As the time approaches, I will be giving you more information about this.
6. Exams - 400 points
 - a. I am going to give four exams each worth 100 points. Exams will be a combination of multiple choice, matching and short answers. Each exam will be made available to you online in a one-week window **ON CANVAS**. This window allows you the freedom to schedule a time that works best for you to accomplish the assignment. Please *see the schedule for when each exam will be available* and what it will cover. All exams are password protected and passwords will only be given to University approved proctors. It is your responsibility to select an eligible proctor, schedule exams with your proctor, and abide by all rules for bringing only appropriate materials into the testing area.

Exam Proctoring:

In accordance with Colorado State University Online proctoring guidelines, Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You **DO NOT** need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, a stable Internet connection, and the chrome web-browser (this is the only web-browser that Honorlock works with). Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it's on a secondary device. Instructions on how to prepare your web-browser for use of Honorlock, as well as where to go for support will be given in the days preceding our first exam. Please look for an announcement regarding this within Canvas.

Grades:

<u>Grade</u>	<u>Percentage</u>
A+	97-100%
A	90 - < 97%
B+	87 - < 90%
B	80 - < 87%
C+	77 - < 80%
C	70 - < 77%
D	60 - < 70%
F	below 60%

Grade Breakdown:

<u>Assignment</u>	<u>Points Counted</u>
4 Exams (100 points each)	400
Summary questions	14
Drag-n-drop assignments	30
Chapter 8 work sheet	10
Structural tutorials	30
<u>14 Quizzes (5 points each)</u>	<u>70</u>
Total	554

Extra Credit:

In previous semesters I use an online classroom participation tool referred to “polleverywhere”. As you listen to content via Echo360 of the previous semesters recordings you will notice that I often poll students using this online tool. You cannot participate live in the polling as the polling was done in FA19 and SP2020. However, I am going to make discussion forums available on Canvas that will have specific due dates. These forums will ask you to respond to the polls that were conducted in that specific days Echo360 recording. If you participate in 80% or more of these discussion forums, on time, then I will give you **10 points extra credit**. I do want to make a disclaimer about these discussion forums. They will be given a point value of 0.01 points. This will allow me to easily track your participation in order to award the extra credit while not significantly impacting the grade that Canvas reports to you. Understand that the 0.01 points WILL NOT count toward or against your final grade. Rather, it will only count toward allowing me to award the extra credit.

In addition to the discussion forum, over the course of the semester you will find “practice materials” in the book for each chapter. These materials are comprised of multiple choice and short answer questions. They are optional however, I feel that they will be very helpful in preparing you for the exams. As an incentive to do this I will give **5 points extra credit** to any student that completes **twelve chapters or more** of these questions. Keep in mind that you do not have to get the questions correct to get the extra credit, you simply need to do them. Finally, keep in mind that the

practice quizzes for each chapter will close as follows:

Chapters 1-4: Close 9/22 at 11:59PM (same day as exam 1)
Chapters 5-8: Close 10/20 at 11:59PM (same day as exam 2)
Chapters 9-11: Close 11/17 at 11:59PM (same day as exam 3)
Chapters 12-14: Close 12/15 at 11:59PM (same day as exam 4)

In other words, you will need to work on these throughout the semester!

Academic Integrity: This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog.

In summary, my desire is that this class maintains a HIGH level of academic integrity consistent with the Student Code of Conduct.

End of the Semester: I know that there will be a handful of people at the end of the semester that need “just a few points” to get the grade they desire. The extra credit assignment will be designated as THE mechanism to get these points. **I WILL NOT NEGOTIATE GRADES AT THE END OF THE SEMESTER.** It is my expectation that you will accept the grade assigned to you and take responsibility for YOUR work throughout the semester. Grade negotiation always leads to someone receiving special treatment and is a policy that I cannot abide as I desire to maintain an atmosphere of academic honesty and integrity. If you are concerned about your grade please come and talk to me **DURING** the semester when something **can be done** about it.

Lecture Schedule

All Assignments are due at 11:59PM Mountain time zone on dates listed here.

WEEK	TOPIC	TEXT	QUIZ (DUE)	SUMM/REFLECT ? (DUE DATE)	OTHER ASSIGNMENTS
ONE	Introduction – Lecture 0				
	Physical Considerations for Living Systems – Lecture 1 (Through LN01D)	Chapter 1	1 (9/1)	1 (8/31)	
TWO	Chemical Considerations for Living Systems – Lecture 2	Chapter 2	2 (9/8)	2 (9/7)	

THREE	Biological Considerations for Living Systems (Gene Expression) – Lecture 3	Chapter 3	3 (9/15)	3 (9/8)	
	Amino Acids: The Building Blocks of Proteins – Lecture 4	Chapter 4	4 (9/15)	4 (9/10)	
	Amino Acid Structural tutorial	Chapter 4			9/10
	Peptide Backbone Tutorial and Quiz – <i>Complete prior to listening to LN05A</i>	Chapter 5			9/11
	Secondary Structure Tutorial and Quiz – <i>Complete prior to listening to LN05B</i>	Chapter 5			9/14
	The Three-Dimensional Structure of Proteins – Lecture 5 (Through LN05A)	Chapter 5			
FOUR	The Three-Dimensional Structure of Proteins – Lecture 5 (Through LN05E)	Chapter 5		5 (9/18)	
	EXAM I – Worth 100 Points Over LN01A-LN05E <i>Opens 9/22 at 12AM and Closes 9/22 at 11:59PM</i>	Chapters 1-5			
FIVE	The Three-Dimensional Structure of Proteins – Lecture 5 Through LN05F-LN05H/LN06A	Chapter 5	5 (9/29)		
SIX	Enzymes: The Catalyst of Biological Life – Lecture 6	Chapter 6	6 (10/6)	6 (10/2)	
	Enzyme Kinetics: Measuring and Comparing Enzyme's Abilities – Lecture 7 (Finish LN07B next week)	Chapter 7	7 (10/6)	7 (10/6)	
SEVEN	Ligand Binding, Allostery, and Cooperativity – Lecture 8 (Finish LN08D-F next week)	Chapter 8	8 (10/15)	8 (10/15)	
	Hb Structural Tutorial and Quiz – <i>Complete after listening to LN08B</i>	Chapter 8			10/8
	Hb Structural Tutorial Worksheet– <i>Complete while listening to LN08C</i>	Chapter 8			10/9
EIGHT	EXAM II – Worth 100 Points Over LN06-LN08 <i>Opens 10/20 at 12AM and Closes 10/20 at 11:59PM</i>	Chapters 6-8			
	Ligand Binding, Allostery, and Cooperativity – Lecture 8	Chapter 8	8 (10/15)	8 (10/15)	

NINE	Membrane Proteins and Transport – Lecture 9 <i>(Through LN09C)</i>	Chapter 9			
TEN	Membrane Proteins and Transport – Lecture 9	Chapter 9	9 (10/27)	9 (10/27)	
	Bioenergetics and Metabolic Regulation – Lecture 10 <i>(Through LN10C)</i>	Chapter 10			
ELEVEN	Bioenergetics and Metabolic Regulation – Lecture 10	Chapter 10	10 (11/3)	10 (11/3)	
	Carbohydrate Metabolism – Lecture 11 <i>(Through LN11B)</i>	Chapter 11			
	Chapter 11 Drag-n-drop and Quiz – <i>Complete prior to listening to LN11B</i>	Chapter 11			11/5
TWELVE	Carbohydrate Metabolism – Lecture 11	Chapter 11	11/12	11/12	
	EXAM III – Worth 100 Points Over LN09-LN11 <i>Opens 11/17 at 12AM and Closes 11/17 at 11:59PM</i>	Chapters 9-11			
THIRTEEN	Citric Acid Cycle - Lecture 12	Chapter 12	12 (12/1)	12 (11/20)	
	Chapter 12 Drag-n-drop and Quiz – <i>Complete prior to listening to LN12C</i>	Chapter 12			11/19
FOURTEEN	Oxidative Phosphorylation - Lecture 13	Chapter 13	13 (12/8)	13 (12/8)	
FIFTEEN	Lipid Metabolism – Lecture 14	Chapter 14	14 (12/11)	14 (12/11)	
SIXTEEN	EXAM IV – Worth 100 Points Over LN12-LN14 <i>Opens 12/15 at 12AM and Closes 12/15 at 11:59PM</i>	Chapters 12-14			