

messaging is your mode of choice understand that your plans standard text messaging rates will apply.

Prerequisites: CHEM 245 or CHEM 341 or CHEM 345; LIFE 102 or BZ 110 or BZ 120

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.

COVID-19: **All students should fill out a [student-specific symptom checker](#) each day before coming to class.** In addition, please utilize the symptom checker to report symptoms, if you have a positive test, or exposed to a known COVID contact. If you know or believe you have been exposed or are symptomatic, it is important for the health of yourself and others that you report it through this checker. You will not be in trouble or penalized in any way for reporting. If you report symptoms, or if you have a positive test, you will receive immediate instructions on what to do and CSU’s Public Health Office will be notified. Once notified, that office will contact you and most likely conduct contact tracing, initiate any necessary public health requirements and/or recommendations and notify you if you need to take any steps. For the latest information about the University’s response please visit the [CSU COVID-19 site](#).

Learning goals: Principles of Biochemistry is designed to introduce you to major topics in the field of biochemistry. The class is broken into four major units: 1. Parts, Driving Forces, and Processes 2. Structural Biology 3. Macromolecular Function 4. Metabolism. In the first unit we will focus exclusively on chemical concepts followed by protein structure. In the 3rd 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:

I will be using Canvas this semester in order to make available to you lecture notes, exam study materials, and lecture recordings. On Canvas, you will find the following:

- a. Course home page:
 - i. When you login to this course this will be the default page.
- b. Announcements:
 - i. I will make periodic announcements within Canvas to keep you abreast with the “happening” of 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.
 3. Face-to-face worksheet assignments.
 - iii. There are 4 exam study materials modules:
 1. These modules contain: study guides, practice exams, learning objectives. They are found immediately following the last chapter for that particular exam.
- d. Grades:
 - i. I will report the grades on all your assignments in this tool as well as your final grade.
- e. 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 virtual portion of the course is simply done by listening to each lecture recording in Echo360.** Extra credit will be given to students completing discussion questions for each Echo360 recording (see below). **Attendance at the face-to-face sessions will be critical for your success as assignments will be handed out, completed, and handed in during these times.** In all cases you will be held accountable for all material presented in both the virtual and face-to-face environment.

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 summary/reflection questions (15 points total), 2 drag-n-drop assignment (30 points), 1 group work assignment (10 points), 3 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- 15 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 address how and when to complete this assignment.
4. Structural tutorials – 30 points
 - a. These assignments will be presented in the book with accompanying quizzes for chapter 4 and 5 material. In class discussion will follow. As the time approaches, I will be giving you more information about this.
5. Face-to-face worksheets – 70 points
 - a. These will be handed out, completed, and handed in during each group’s face-to-face meeting throughout each week. There will be a total of ***nine*** 10-point assignments throughout the semester ONLY ***seven*** of which will be counted toward your final grade. These assignments/quizzes are meant to enrich your understanding of the materials presented in the Echo360 recordings.

6. Exams - 400 points
 - a. I am going to give four exams. Each one will be worth 100 points.

Exam Proctoring: Exams, due to the reduced capacity of Yates 104, will be administered virtually. In order to do so we will be using Respondus Lockdown Browser and Monitor. This proctoring option will require that you download and install software AND have a functional webcam on your computer. You can [watch this video](#) for a quick overview of this proctoring option. Please also visit [Colorado State's University testing center](#) for more information on this proctoring option. Once at this page look at the resources under the "Instructions for Student". Finally, as our first exam approaches please look for an announcement regarding all of 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/Reflection questions	14
Drag-n-drop assignments	30
Face-to-face worksheets	70
Structural tutorials	30
<u>14 Quizzes (5 points each)</u>	<u>70</u>
Total	614

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 **5 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 all the questions correct to get the extra credit, you simply need to do them and record a **numerical score greater than zero on 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!

Finally, there are nine total face-to-face sessions and only seven of the worksheets in these sessions will count toward your final grade. I will give **2.5 points** extra credit for each additional worksheet you complete OVER the seven required. This amounts to an additional **5 points extra credit.**

Academic Integrity: This course will adhere to the Academic Integrity Policy found in the Colorado State University [General Catalog](#).

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 assignments listed above 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
SUBJECT TO CHANGE

DATE	DAY	TOPIC/Echo360 recording	TEXT	QUIZ (DUE DATE)	REFLECT? (DUE DATE)	OTHER ASSIGNMENTS (DUE DATE)	FACE-TO- FACE HYBRID SECTION
8/24	M	Introduction & Physical Considerations for Living Systems – LN01A	Chapter 1				Group 1
8/25	T	Physical Considerations for Living Systems – LN01B	Chapter 1				Group 2
8/27	R	Physical Considerations for Living Systems – LN01C	Chapter 1				Group 3
8/28	F	Physical Considerations for Living Systems – LN01D	Chapter 1				Group 4
8/31	M	Chemical Considerations for Living Systems – LN01E/LN02A	Chapter 2	1 (9/1)	1 (8/31)		Group 1
9/1	T	Chemical Considerations for Living Systems – LN02B	Chapter 2				Group 2
9/3	R	Chemical Considerations for Living Systems – LN02C	Chapter 2				Group 3
9/4	F	Chemical Considerations for Living Systems – LN02D	Chapter 2	2 (9/8)	2 (9/7)		Group 4
9/8	T	Biological Considerations for Living Systems (Gene Expression) – LN03A/LN04A	Chapter 3	3 (9/15)	3 (9/8)		Group 2
9/10	R	Amino Acids: The Building Blocks of Proteins – LN04B	Chapter 4	4 (9/15)	4 (9/11)	<i>Amino Acid Structural tutorial (DUE 9/10)</i>	Group 3
9/11	F	The Three-Dimensional Structure of Proteins – LN04C/LN05A	Chapter 5			<i>Peptide Backbone/Torsion Angles Tutorial (DUE 9/11)</i>	Group 4
9/14	M	The Three-Dimensional Structure of Proteins – LN05B	Chapter 5			<i>Secondary Structure Tutorial (DUE 9/14)</i>	Group 1
9/15	T	The Three-Dimensional Structure	Chapter 5				Group 2

		of Proteins – LN05C					
9/17	R	The Three-Dimensional Structure of Proteins – LN05D	Chapter 5				Group <u>3</u>
9/18	F	The Three-Dimensional Structure of Proteins – LN05E	Chapter 5				Group <u>4</u>
9/21	M	Catch-up					Group <u>1</u>
9/22	T	Exam I – LN01A – LN05E					
9/24	R	The Three-Dimensional Structure of Proteins – LN05F	Chapter 5				
9/25	F	The Three-Dimensional Structure of Proteins – LN05G	Chapter 5	5 (9/29)	5 (9/18)		
9/28	M	Enzymes: The Catalyst of Biological Life – LN05H/LN06A	Chapter 6				Group 1
9/29	T	Enzymes: The Catalyst of Biological Life – LN06B	Chapter 6				Group 2
10/1	R	Enzymes: The Catalyst of Biological Life – LN06C	Chapter 6				Group 3
10/2	F	Enzymes: The Catalyst of Biological Life – LN06D	Chapter 6	6 (10/6)	6 (10/1)		Group 4
10/5	M	Enzyme Kinetics: Measuring and Comparing Enzyme’s Abilities – LN07A	Chapter 7				Group 1
10/6	T	Enzyme Kinetics: Measuring and Comparing Enzyme’s Abilities – LN07B	Chapter 7	7 (10/6)	7 (10/6)		Group 2
10/8	R	Ligand Binding, Allostery, and Cooperativity – LN08A	Chapter 8				Group 3
10/9	F	Ligand Binding, Allostery, and Cooperativity – LN08B	Chapter 8				Group 4
10/12	M	Ligand Binding, Allostery, and Cooperativity – LN08C	Chapter 8				Group 1
10/13	T	Ligand Binding, Allostery, and Cooperativity – LN08D	Chapter 8				Group 2
10/15	R	Ligand Binding, Allostery, and Cooperativity – LN08E & LN08F	Chapter 8	8 (10/15)	8 (10/15)		Group 3
10/16	F	Catch-up					Group 4
10/19	M	Exam II (LN05F-LN08F)					

10/20	T	The Lipid Bilayer, Membrane Proteins, and Transport – LN09A	Chapter 9				
10/22	R	The Lipid Bilayer, Membrane Proteins, and Transport – LN09B	Chapter 9				
10/23	F	The Lipid Bilayer, Membrane Proteins, and Transport – LN09C	Chapter 9				
10/26	M	The Lipid Bilayer, Membrane Proteins, and Transport – LN09D	Chapter 9	9 (10/27)	9 (10/27)		Group 1
10/27	T	Bioenergetics and Metabolic Regulation – LN09E/LN10A	Chapter 10				Group 2
10/29	R	Bioenergetics and Metabolic Regulation – LN10B	Chapter 10				Group 3
10/30	F	Bioenergetics and Metabolic Regulation – LN10C	Chapter 10				Group 4
11/2	M	Bioenergetics and Metabolic Regulation – LN10D	Chapter 10				Group 1
11/3	T	Bioenergetics and Metabolic Regulation – LN10E	Chapter 10	10 (11/3)	10 (11/3)		Group 2
11/5	R	Carbohydrate Metabolism – LN11A	Chapter 11			<i>Glycolysis Drag-n-drop (DUE 11/5)</i>	Group 3
11/6	F	Carbohydrate Metabolism – LN11B	Chapter 11				Group 4
11/9	M	Carbohydrate Metabolism – LN11C	Chapter 11				Group 1
11/10	T	Carbohydrate Metabolism – LN11D	Chapter 11				Group 2
11/12	R	Carbohydrate Metabolism – LN11E	Chapter 11	11 (11/12)	11 (11/12)		Group 3
11/13	F	Catch-up					Group 4
11/16	M	Exam III (LN09A – LN11E)					
11/17	T	The Citric Acid Cycle- LN12A	Chapter 12				
11/19	R	The Citric Acid Cycle- LN12B	Chapter 12	12 (12/1)	12 (11/20)	<i>Citric acid cycle Drag-n-drop (DUE 11/19)</i>	
11/20	F	Oxidative Phosphorylation – LN12C/LN13A	Chapter 13				
11/22-28		FALL BREAK					

11/30	M	Oxidative Phosphorylation – LN13B	Chapter 13				
12/1	T	Oxidative Phosphorylation – LN13C	Chapter 13				
12/3	R	Oxidative Phosphorylation – LN13D	Chapter 13				
12/4	F	Oxidative Phosphorylation – LN13E	Chapter 13				
12/7	M	Oxidative Phosphorylation – LN13F/LN14A	Chapter 13	<i>13 (12/8)</i>	<i>13 (12/8)</i>		
12/8	T	Lipid Catabolism – LN14B	Chapter 14				
12/10	R	Lipid Catabolism – LN14C	Chapter 14	<i>14 (12/11)</i>	<i>14 (12/11)</i>		
12/11	F	Catch-up					
12/15	T	Final Exam (LN12A – LN14C)					