Colorado State University Department of Biochemistry
BC 403-801 Comprehensive Biochemistry II - Metabolism

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Office hours:	Monday 4-5 PM or by appointment via MS Teams

Prerequisites: CHEM 245 or CHEM 341 or CHEM 345 or a semester of organic chemistry

Textbook: The **suggested text** is:
1. Lehninger's Principles of Biochemistry, Nelson, Cox, 7th Edition, WH Freeman

Other texts that would work:
1. Lehninger's Principles of Biochemistry, Nelson, Cox, 6th Edition, WH Freeman
2. Textbook of Biochemistry with Clinical Correlations 6th Edition, Wiley-Liss
3. Voet and Voet Biochemistry 4th Edition, Wiley
4. Berg, Tymoczko, Gatto, Stryer Biochemistry 8th edition, Freeman-MacMillan

Objectives: BC403 is designed to provide an understanding of the molecular and cellular features that constitute and regulate the central pathways in metabolism. We will focus on metabolism of carbohydrates, lipids, and amino acids, from absorption to tissue specific utilization and production. 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.

Course Design: In a course covering a subject, which is the core of biochemistry, a balance has to be struck between covering a variety of topics and, at the same time, going into sufficient depth to make for rewarding study. BC403 has been designed with this constraint in mind. The course can be divided into 5 units:

Unit 1 – Laying the Foundations (**Lecture 1**)
Unit 2 – Carbohydrate Metabolism (**Lectures 2 – 6**)
Unit 3 – Cellular Respiration (**Lectures 7 – 9**)
Unit 4 – Lipid Metabolism (**Lectures 10 – 11**)
Unit 5 – Amino Acid Metabolism (**Lecture 12**)

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. Syllabus module that contains:
            1. Start Here page (please visit this).
        ii. Lecture Modules that contain:
            1. A powerpoint file for that the modules set of lectures.
            2. Links to discussion forums, quizzes, and other assignments for that particular module.
        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 and Quizzes:
        i. This is where your quizzes, exams, and other assignments for the class will be found.
    e. Grades:
        i. I will report the grades on all your assignments in this tool as well as your final grade.
    f. 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. 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 this [website](#).

Assignments: This class consists of 13 quizzes (65 points) 5 problem sets (65 points), 4 exams (360 points), and five metabolic puzzle assignments (50 points) as detailed below:

1. Quizzes – 60 points
   a. There will be 12 quizzes each worth five points. Quizzes will be presented on Canvas and will be open for a 1-week period of time. Once you begin the quiz you will have 25 minutes to complete it. Due dates for quizzes will **usually** land on a Wednesday and will be announced in class. You will have two opportunities to take each quiz.
2. Problem sets – 65 points
   a. Five problem sets will be posted on Canvas during the course of the semester. Written answers to the questions will be due on the specified dates (announced and stated on the assignment) and will be graded for accuracy and completeness and checked for plagiarism.
3. Exams - 360 points
   a. Four exams are scheduled. The exams are not cumulative, i.e. they will cover only material presented in the lectures following the previous exam. All of the exams will include both objective and short answer essay questions. The format for the exams will be described in class.
4. Metabolic map puzzle – 50 points
   a. This semester we will have five assignments that are devoted to completing a "metabolic puzzle". Each student will be given eight "sections" of a partially completed metabolic map. As we work our way through each pathway, students will be asked to fill in details on the map and put together the "puzzle". Detailed instructions for each portion of the puzzle will be given on each assignment. There will be a total of five portions of the puzzle each worth 10 points.

Exam Proctoring: In accordance with Colorado State University Online proctoring guidelines, students will use Honorlock, an online proctoring service, which requires that your computer has a webcam and a microphone. If your computer meets the technical requirements, you can take exams on your own computer from the privacy of your own home. More information regarding setting up your computer to use Honorlock will be given in Canvas announcements in the weeks leading up to the 1st exam.

| Grades: | Final grades for the course will be assigned as follows: |

	Grade	Final Average
	A+	97-100%
	A	90 - 96%
	B+	87 - 89%
	B	80 - 86%
	C+	77 - 79%
	C	70 - 76%
	D	60 - 69%
	F	<60%

Grade Breakdown:

Assignment	**Points Counted**
4 Exams (90 points each)	360
5 Problem sets (13 points each)	65
Metabolic Map Puzzle	50
12 quizzes (5 points each)	60
Total	535

Extra Credit: In previous semesters I used the online classroom participation tool "iclicker". As you listen to content via Echo360 of the previous semester's 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 SP2022. 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.

Academic Integrity: 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 assignment 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	CANVAS RECORDINGS/ DISCUSSION FORUMS	TEXT READING	QUIZZES	PROBLEM SET OR PUZZLE
8/22	M	Laying the Foundation – **Lecture 1**	LN01A	225-230; 491-524; 575-588		
8/24	W	Laying the Foundation – **Lecture 1**	LN01B			
8/26	F	Laying the Foundation – **Lecture 1**	LN01C			
8/29	M	Glucose Absorption – **Lecture 2**	LN01D/LN02A	408-410; 421		
8/31	W	Glucose Absorption – **Lecture 2**	LN02B/LN03A		**Quiz 1,2,3**	
9/2	F	Glycolysis – **Lecture 3**	LN03B	533-558		**Problem Set #1**
9/7	W	Glycolysis – **Lecture 3**	LN03C		**Quiz 4**	
9/9	F	Gluconeogenesis (GNG) – **Lecture 4**	LN04A	558-564		
9/12	M	Gluconeogenesis (GNG) – **Lecture 4**	LN04B/LN05A			**Metabolic Puzzle #1**
9/14	W	Glycogen metabolism – **Lecture 5**	LN05B/LN06A	601-614	**Quiz 5**	**Problem Set #2**
9/16	F	Regulation of glucose metabolism – **Lecture 6**	LN06B	440-465, 589-599, 932-935		
9/19	M	Review	LN06C/Exam 1 Q&A			
9/21	W	**Exam 1**		*Lecture 1-5*		
9/23	F	Regulation of glucose metabolism – **Lecture 6**	LN06D			
9/26	M	Regulation of glucose metabolism – **Lecture 6**	LN06E			
9/28	W	Regulation of glucose metabolism – **Lecture 6**	LN06F		**Quiz 6**	
9/30	F	Pyruvate dehydrogenase complex – **Lecture 7**	LN06G/LN07A	619-624		
10/3	M	Pyruvate dehydrogenase complex – **Lecture 7**	LN07B/LN08A	624-642		**Problem set #3**
10/5	W	Citric acid cycle – **Lecture 8**	LN08B			**Metabolic Puzzle #2**

10/7	F	Review	LN08C/Exam 2 Q&A		**Quiz 7**	
10/10	M	**Exam 2**		***Lecture 6-8 (up through LN08C)***		
10/12	W	Oxidative phosphorylation – **Lecture 9**	LN08D/LN09A	565-570;711-739; 742-743		
10/14	F	Oxidative phosphorylation – **Lecture 9**	LN09B			
10/17	M	Oxidative phosphorylation – **Lecture 9**	LN09C			
10/19	W	Oxidative phosphorylation – **Lecture 9**	LN09D			
10/21	F	Oxidative phosphorylation – **Lecture 9**	LN09E		**Quiz 8**	
10/24	M	Oxidative phosphorylation – **Lecture 9**	LN09F			
10/26	W	Oxidative phosphorylation – **Lecture 9**	LN09G			
10/28	F	Oxidative phosphorylation – **Lecture 9**	LN09H			
10/31	M	Oxidative phosphorylation – **Lecture 9**	LN09I		**Quiz 9**	**Metabolic Puzzle #3**
11/2	W	Lipid absorption and transport – **Lecture 10**	LN10A	649-652; 826-830; 842-854		
11/4	F	Lipid absorption and transport – **Lecture 10**	LN10B			
11/7	M	Exam 3 Review	Exam 3 Q&A			
11/9	W	**Exam 3**		***Lecture 7-9***		
11/11	F	Lipid absorption and transport – **Lecture 10**	LN10C			
11/14	M	Lipid absorption and transport – **Lecture 10**	LN10D			
11/16	W	Lipid absorption and transport – **Lecture 10**	LN11A	653-670; 811-826	**Quiz 10**	
11/18	F	Lipid metabolism – **Lecture 11**	LN11B			
11/21-11/25		**Fall Break**				
11/28	M	Lipid metabolism – **Lecture 11**	LN11C			
11/30	W	Lipid metabolism – **Lecture 11**	LN11D			**Problem Set #4**
12/2	F	Lipid metabolism – **Lecture 11**	LN11E		**Quiz 11**	**Metabolic Puzzle #4**
12/5	M	Amino acid absorption/metabolism – **Lecture 12**	LN12A			

12/7	W	Amino acid absorption/metabolism – **Lecture 12**	LN12B			**Problem Set #5**
12/9	F	Exam 4 Review	Exam 4 Q&A		**Quiz 12**	**Metabolic Puzzle #5**
12/12	M	**Exam 4**		*Lecture 10-12*		