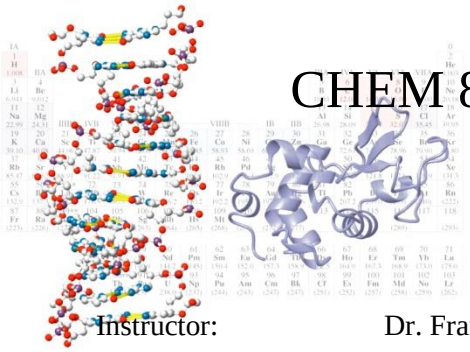

CHEM 855 –Principles of Biochemistry

SYLLABUS

Instructor:	Dr. Frank A. Kovacs
Email:	kovacsfa@unk.edu - Email checked each morning 8-9 am (M-F)
Class Dates:	June 3 – July 26, 2024
Text:	*Lehninger Principles of Biochemistry*, 4th ed. (Nelson and Cox, *4th Ed ISBN-13:* 9780716743392) This text is out of print but you should be able to easily find used copies online. **See Canvas "Textbook" folder** for more information on getting access to the text.
Lectures:	Lecture videos highlighting important topics for each chapter covered will be posted for each week.
Problem videos:	I will post a few short videos of how to work certain kinds of problems that may be found on the quizzes and exams. I am very willing to post additional problem examples upon request but keep in mind there could be at least a 1-2 day period before the requested extra problems will get posted.
Chapter objectives:	I will post a list of objectives for each of the chapters covered in this course.

Course Description

Biochemistry is the study of the chemistry of living organisms. This chemistry is water based and involves biopolymers like proteins and nucleic acids (DNA and RNA) and other biologically relevant molecules like lipids, carbohydrates, hormones, and vitamins. We will begin with a review of the foundations of biochemistry and the chemistry of water. We will then move on to address various aspects of the structure, function and metabolism of the range of biomolecules mentioned above. The course closes with a discussion of the basics of metabolism and metabolic pathways.

Course objectives summary

Upon completion of this course, students should have a basic understanding of:

1. Structure and function of basic biomolecules like proteins, nucleic acids, carbohydrates, etc. and their locations in cells.
2. How biological information is stored and transmitted.
3. Acid/base chemistry of water and its effect on biomolecular structure and function.
4. Enzyme function and mechanisms.

5. Structure and function of lipids.
6. Structure and function of biological membranes.
7. The metabolism of the breakdown of glucose to produce ATP as an example of how metabolism works.

Grading Policy

Your grade will be based on the number of accumulated points as a percentage of the total possible number of points according to the distribution given below:

Quizzes	6 at 12 pts ea.	72
BioChemQuiz Development/Discussion	14 at 5 pts ea.	70
Term Project		100
Exams	2 exams - 100 points ea.	200
Total		442

Grading - Grades will be assigned using the following grading scale: A (93-100%), A- (90-92%), B+ (88-89%), B (83-87%), B- (80-82%), C+ (78-79%), C (73-77%), C- (70-72%), D+ (68-69%), D (63-67%), D- (60-62%), and F (below 60%).

Exams - The exams will be given in 2 parts.

- **Part 1 (100 pts)** will be given on Canvas and will be ***True/False, Multiple-Choice, and Matching*** (40 questions). These will be timed exams and you will have exactly **75 minutes** to complete it (exam will be set to auto-submit). They will also be set to one question at a time with no backtracking.
- **Part 2 (100 points)** will be an ***Essay*** exam made of 5 questions each worth 20 points. These will be timed exams and you will have exactly **60 minutes** to complete it (exam will be set to auto-submit). **This part will require use of the Lockdown Browser.**

Quiz - A quiz will be posted for each week covering the chapters for that week via Canvas. There will be no quiz for the week of the exam. They will be available from the beginning of the course and closed by the end of the day on Sunday of the week to which they are assigned.

BioChemQuiz – Part of mastering a subject is learning how to ask and answer good questions about that subject. You will need to develop a 3 question BioChemQuiz each week for discussion by the class. These quizzes will be Multiple Choice. I have posted a handout describing this assignment in more detail. It contains a sample quiz to give you more information on how to approach this assignment. You will post your quiz as a Word Doc using the format shown in the handout on the BioChemQuiz Discussion Board. You should then review the quizzes of 2 classmates and post comments under their submission.

To receive full credit, your BioChemQuiz must be posted the end of day (11:59pm) on Thursday (**2.5 pts will be deducted if you miss this deadline**) and your comments must be posted by the end of the day on Sunday of each week they are assigned (**2.5 pts will be deducted if you miss this deadline)**. Pay close attention to the due dates in Canvas because most weeks will have more than one quiz due.

Term Project (Educator Option) - At the graduate level, one must develop the ability to create original instructional material from existing knowledge. As a term project, you are required to write an "original"

2-3 day lesson plan that introduces and/or reinforces one or more concepts from the covered material. Your write-up should include a

1. Lesson plan summary in the format that you would turn in to your principal or department head,
2. Detailed outlines (with full explanations of any example problems) of any lectures
3. Full descriptions and "teacher notes" for any demonstrations
4. Complete handouts for any lab experiments (include a background section, procedural instructions for students, additional notes for teachers, and information on chemical hazards, safety, and storage considerations)
5. Homework assignments and
6. Quizzes.

See schedule for due date.

Term Project (Literature Research Option) - At the graduate level, chemistry professionals must develop the ability to analyze and communicate material directly from original research reports to a less-specialized audience. As a term project, you are required to write a 1,500-word-minimum summary and analysis of a full-length literature article published in the past two years on biochemistry research. See schedule for due date.

Course Policies

Policy on plagiarism: Anyone caught plagiarizing including using AI on any exercise will receive a 0 for that exercise; subsequent violations will result in referral to the Vice Chancellor for Academic Affairs for dismissal from the university.

Policy on incomplete: To be considered for an incomplete in Chemistry 855:

1. You must submit the reasons you cannot complete the scheduled work. This must include a copy of your class schedule and description of your responsibilities outside the classroom. This should be done in writing and include confirmation from your employer or doctor when appropriate.

2. You must specify the assignments you have missed and a schedule of plans to complete them.

3. Upon completion of items 1-2, your request for an incomplete will be considered.

I expect all students to progress through the requirements for CHEM 855 in a timely fashion. Unless your circumstance is quite remarkable, do not consider an incomplete.

Tests and quizzes will not be rescheduled without valid reason.

University Policies can be found at:

https://canvas.unk.edu/courses/46109/pages/department-and-university-policies

Course Schedule (See Canvas "Syllabus" tab for detailed listing of assignments and due dates):

Week Starting on:	Week #	Chapters to be Covered
June 3	1	Chap 1 - Foundations Chap 2 – Water
June 15	2	Chap 3 - Amino Acids Chap 4 –Protein Structure

June 22	3	Chap 5 –Protein Function: O_2 Binding Proteins Chap 6 – Enzymes
June 29	4	Chap 7 - Carbohydrates
July 6	5	Chap 8 – Nucleotides and Nucleic Acids
July 13	6	Chap 10 – Lipids Chap 11 – Biological Membranes
July 20	7	Chap 13 – Bioenergetics Chap 14 – Glycolysis
July 27	8	Chap 16 – Citric Acid Cycle Chap 19 – Oxidative Phosphorylation