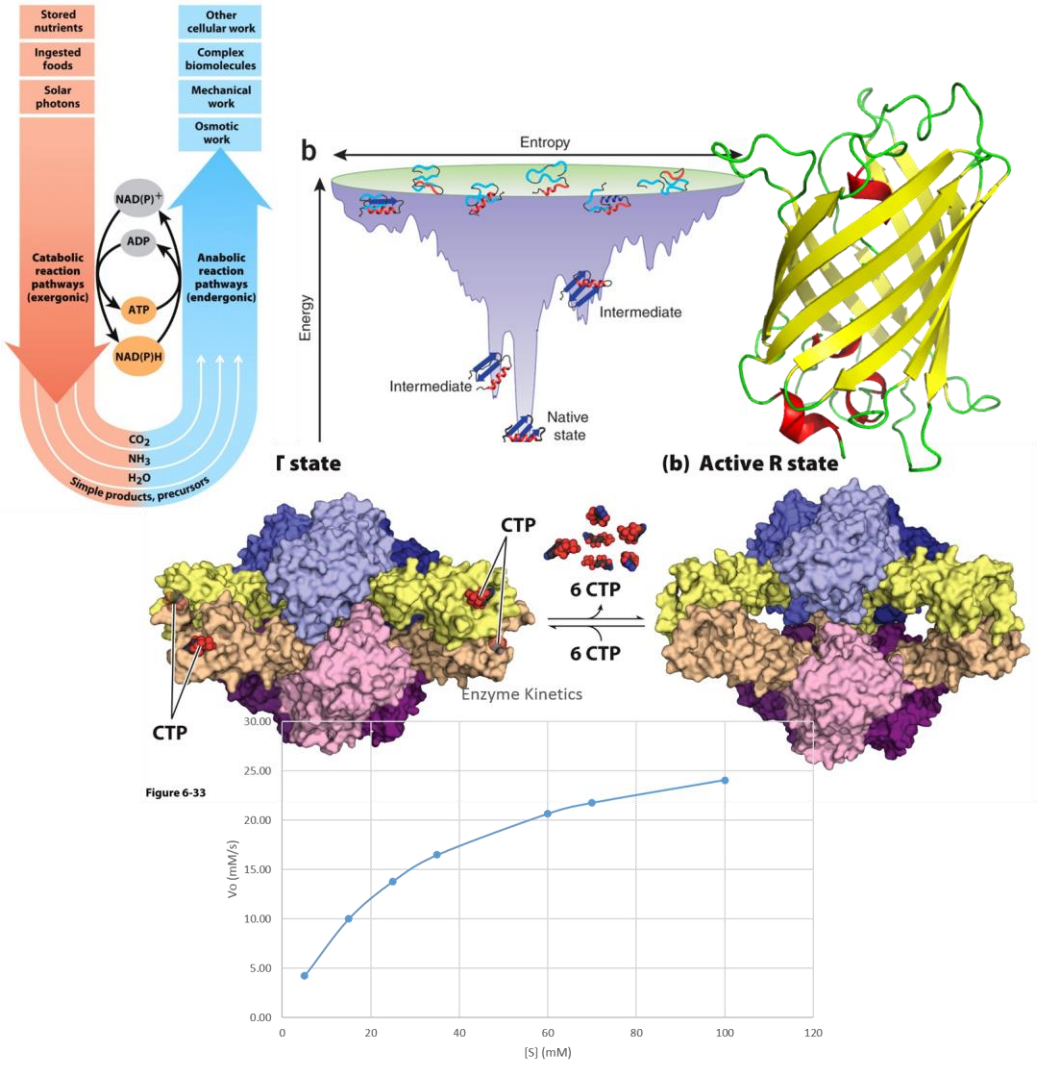
Biochemistry I
CHEM 4334



Let's see how life works!!

CHEM 4334 Section 001 Biochemistry I Spring 2025

Instructor: Dr. Dustin Patterson
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Office Hours: Tuesday 9:30-10:30 am, Thursday 1:30-3:30 pm, and by appointment.
Lecture: Tuesday and Thursday 11:00am-12:20pm face-to-face in Cowan Fine Arts Center room 1009.
Text: Biochemistry: Concepts and Connections by D.R. Appling, S.J. Anthony-Cahill, and C.K. Matthews.
Equipment: Pencils, scientific calculator, and ruler.
Course Resources: Additional materials will be provided as either handouts or through Canvas.

Lecture Recordings: All lectures will be recorded, although the quality of the recordings is not guaranteed, and made available via the course website on Canvas. Recordings are made as a supplement to the class, not a replacement for in-person class attendance. Students are also welcome to make their own recordings of the lecture.

Course Content: Biochemistry I (CHEM 4334) is the first part in a two-part course series providing an introduction to fundamental principles and techniques in the chemistry of life, biochemistry. This course builds upon previous knowledge learned in general chemistry and organic chemistry, as well as biology, physics, and mathematics. This course looks to build foundational knowledge in the underlying chemical composition of cells, building upward to the macro-molecular machinery that sustains life and working toward understanding the complex metabolic pathways and energy transfers occurring within cells. In addition, we will look at experimental methods utilized in biochemistry and incorporate current primary literature in topics discussed in the course where useful.

Course Learning Objectives:

- Learn to identify the molecules that are utilized as the foundation of life and gain understanding in their chemical properties/reactivity
- Understand the principles by which molecules are arranged hierarchically to form the functional materials of biology
- Learn experimental techniques utilized in modern experimental biochemistry and how they are employed practically
- Learn fundamentals in the role that proteins play as macromolecular machines and catalysts that carry out many of life's processes
- Gain an understanding of biocatalysis by enzymes and methods for the characterization and manipulation of their kinetics
- Learn about the arrangement of lipid membranes and the role this plays in forming the barriers that organize and regulate life processes
- Learn fundamentals in membrane transport and chemical gradient formation
- Understand the role that structure plays in the function of biomacromolecules

Grade Distribution:
The majority of your grade will be determined by your performance on several midterm exams, in addition to a final cumulative exam. Due to the nature of biochemistry, all exams are comprehensive, but the material covered since the last examination will receive the greatest emphasis. Examinations will cover all materials from text, lectures, and any assigned materials. Homework projects will also be assigned which will also comprise a significant portion of your grade. The breakdown of these components to your final grade is as follows:

Homework	15%
Midterm Exams (3)	60% (20% each)
Final Exam	25%
Total	100%

Final grades will be determined on a standard grading scale of A 90-100%, B 80-89%, C 70-79%, etc. Incentive points may be added, based on initiative, class participation, and improvement in the course.

Academic Honesty
Cheating of any kind will not be tolerated. Please make yourself aware of the university policy for academic dishonesty in the *Student Guide to Conduct and Discipline at UT Tyler*. During examinations only writing utensils, a calculator (non-programmable), and ruler are the only things that will be allowed on your desk, in addition to scrap paper that will be provided. All questions concerning the exam should be directed to the instructor and any talking amongst students may be punishable by point deductions.
NOTE THE POLICY FOR SMART DEVICES BELOW:

Cell phones and smart watches/electronic devices must be put away during exams. If they are observed out in a visually accessible place (i.e. between legs, on the floor, etc.), it will be assumed that they are being used to cheat and your exam will be taken, you will receive a zero score (0 points) for the exam, and you will be referred to the Office of Judicial Affairs.

Artificial Intelligence Use Policy:
For this course, artificial intelligence (AI) use on assignments is not permitted. The work submitted by students in this course will be generated by themselves. It is to the benefit of the student that any homework assigned be done by the student without any AI services. Any instance of the following constitutes a violation of UT Tyler's Honor Code: a student has another person/entity do any portion of a graded assignment, which includes purchasing work from a company, hiring a person or company to complete an assignment or exam, using a previously submitted assignment and/or using AI tools (such as ChatGPT).

Attendance and make-up policy:
Course attendance is expected and is to the benefit of the student. Missing class will likely adversely affect a student's exam performance and will not allow any addition of potential incentive points to their final grade. The instructor should be notified of any expected absences according to the University of Texas at Tyler guidelines and may be excused for reasons allowed by the university (see statements below). Make-ups will be allowed only for reasons outlined in the University of Texas at Tyler bylaws (see below).

Census and Withdraw Dates:
The Census Date is January 27, 2025, and the Last Day to Withdraw is March 31, 2025.

Tentative Lecture Schedule

01/14/25 Introduction and Fundamental Background (Ch. 1, p. 3-17)
01/16/25 Chemical Foundations of Life and the Role of Water (Ch. 2, p. 20-41)
01/21/25 Chemical Foundations of Life and the Role of Water (Ch. 2, p. 20-41)
01/23/25 The Energetics of Life (Ch. 3, p. 49-69)
01/28/25 The Energetics of Life (Ch. 3, p. 49-69)
01/30/25 Nucleic Acids (Ch. 4, p. 73-97)
02/04/25 Nucleic Acids (Ch. 4, p. 73-97)
02/06/25 Introduction to Proteins (Ch. 5, p.109-128)
02/11/25 The Three-Dimensional Structure of Proteins (Ch. 6, p. 145-175)
02/13/25 **Exam 1(Ch. 1-5)**
02/18/25 The Three-Dimensional Structure of Proteins (Ch. 6, p. 145-175)
02/20/25 Experimental Techniques of Protein Biochemistry (Ch. 5 and 6, p. 131-143 and 178-187)
02/25/25 Experimental Techniques of Protein Biochemistry (Ch. 5 and 6, p. 131-143 and 178-187)
02/27/25 Protein Function: Myoglobin and Hemoglobin (Ch. 7, p. 200-220)
03/04/25 Protein Function: Antibodies (Ch. 7, p. 201-209 and 220-227)
03/06/25 Protein Function: Motor Proteins (Ch. 7, p. 220-227)
03/11/25 Enzymes an Introduction (Ch. 8, p. 233-249)
03/13/25 **Exam 2 (Ch. 6-7 and Experimental Techniques Ch. 5/6)**
03/18/25 and 03/20/25 No Class—Spring Break
03/25/25 Enzymes an Introduction (Ch. 8, p. 233-249)
03/27/25 Enzymes Kinetics: Michalis-Menten Kinetics (Ch. 8, p. 249-254)
04/01/25 Enzymes Kinetics: Michalis-Menten Kinetics (Ch. 8, p. 249-254)
04/03/25 Enzymes Inhibition and Regulation (Ch. 8, p. 254-266)
04/08/25 Enzymes Inhibition and Regulation (Ch. 8, p. 254-266)
04/10/25 Carbohydrates (Ch. 9, p. 275-296)
04/15/25 Carbohydrates (Ch. 9, p. 275-296)
04/17/25 **Exam 3 (Ch. 8-10)**
04/22/25 Lipids, Membranes (Ch. 10, p. 301-316)
04/24/25 Lipids, Membranes (Ch. 10, p. 301-316)
04/29/25 **Final Exam 11am-1pm**

Final Exam: Tuesday, April 29, 2025, from 11am-1pm in regular classroom. See spring-2025-final-exam-schedule.pdf for the link to the official schedule.

I reserve the right to make modifications as needed to the course. This will be done in accordance with university bylaws.

See links below for additional information about student resources and University policies.

Student Resources

University Policies and Information