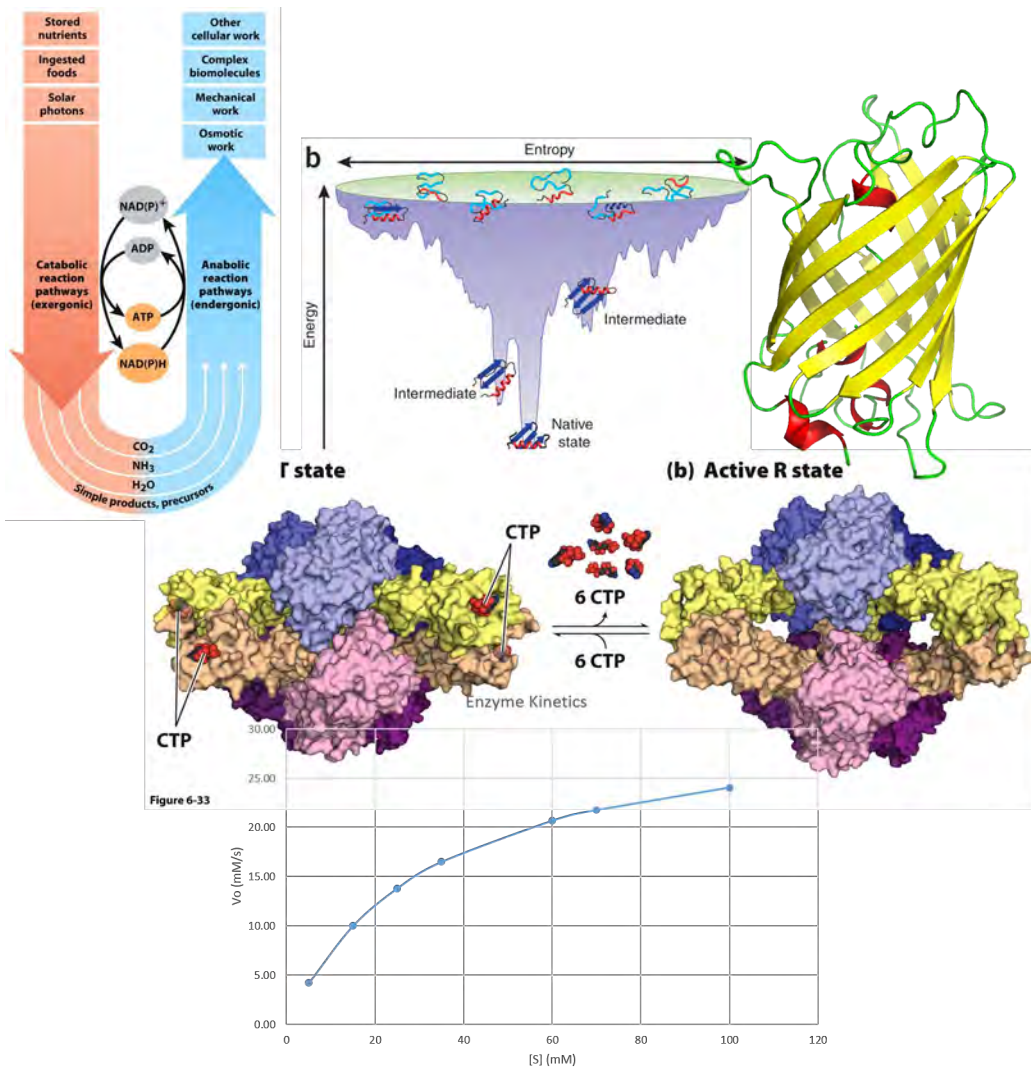


# Biochemistry I

## CHEM 4334



Let's see how life works!!

**Instructor:** Dr. Dustin Patterson

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**Phone:** 903-565-5623

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**Office Hours:** Monday 1-3 pm, Thursday 1:30-2:30 pm, and by appointment.

**Lecture:** Tuesday and Thursday 9:30-10:50 am in Arts and Sciences room 158.

**Prerequisite course(s):** Organic Chemistry I & II (CHEM 3342 and CHEM 3344)

**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 through the course Canvas page.

**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, particularly in the aqueous environment of the cell
- Learn about the chemical composition of DNA and RNA, their structural characteristics, and the molecular basis for their structure, interactions, and functional role in the cell
- Learn fundamentals in the role that proteins play as macromolecular machines and catalysts that carry out many of life's processes
- Learn about the different types of experimental techniques utilized in modern biochemistry and how they are employed practically
- Gain an understanding of biocatalysis by enzymes and methods for the characterization and manipulation of their kinetics
- Learn the chemical composition of carbohydrates, their structural arrangements, and their molecular functions in the cell
- 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

**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. Bi-weekly 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	<u>25%</u>
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 and a calculator (non-programmable) are the only things that will be allowed on your desk. 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 September 9, 2024, and the Last Day to Withdraw is November 4, 2024.

**Tentative Lecture Schedule**

08/27/24 Introduction and Fundamental Background (Ch. 1, p. 3-17)  
08/29/24 Chemical Foundations of Life and the Role of Water (Ch. 2, p. 19-41)  
09/03/24 Chemical Foundations of Life and the Role of Water (Ch. 2, p. 19-41)  
09/05/24 The Energetics of Life (Ch. 3, p. 49-69)  
09/10/24 Nucleic Acids (Ch. 4, p. 73-97)  
09/12/24 Nucleic Acids (Ch. 4, p. 73-97)  
09/17/24 Introduction to Proteins (Ch. 5, p.109-128)  
09/19/24 Introduction to Proteins (Ch. 5, p.109-128)  
09/24/24 The Three-Dimensional Structure of Proteins (Ch. 6, p. 145-175)  
09/26/24 **Exam 1(Ch. 1-5)**  
10/01/24 The Three-Dimensional Structure of Proteins (Ch. 6, p. 145-175)  
10/03/24 Experimental Techniques of Protein Biochemistry (Ch. 5 and 6, p. 131-143 and 178-187)  
10/08/24 Experimental Techniques of Protein Biochemistry (Ch. 5 and 6, p. 131-143 and 178-187)  
10/10/24 Protein Function: Myoglobin and Hemoglobin (Ch. 7, p. 200-220)  
10/15/24 Protein Function: Antibodies (Ch. 7, p. 191-199)  
10/17/24 Protein Function: Motor Proteins (Ch. 7, p. 220-227)  
10/22/24 Enzymes an Introduction (Ch. 8, p. 233-249)  
10/24/24 **Exam 2 (Ch. 6-7 and Experimental Techniques)**  
10/29/24 Enzymes an Introduction (Ch. 8, p. 233-249)  
10/31/24 Enzymes Kinetics: Michaelis-Menten Kinetics (Ch. 8, p. 249-254)  
11/05/24 Enzymes Kinetics: Michaelis-Menten Kinetics (Ch. 8, p. 249-254)  
11/07/24 Enzymes Inhibition and Regulation (Ch. 8, p. 254-266)  
11/12/24 Enzymes Inhibition and Regulation (Ch. 8, p. 254-266)  
11/14/24 Carbohydrates (Ch. 9, p. 275-296)  
11/19/24 Carbohydrates (Ch. 9, p. 275-296)  
11/21/24 **Exam 3 (Ch. 8-9)**  
**11/26/24 and 11/28/24 No Class—Thanksgiving Break**  
12/03/24 Lipids, Membranes (Ch. 10, p. 301-316)  
12/05/24 Cellular Transport (Ch. 10, p. 317-331)

12/12/24 **Final Exam 9:30am-11:30am** (see note below)

**Final Exam:** The final exam is comprehensive and will be held **Thursday, December 12, from 9:30am-11:30am in the regular scheduled classroom**, unless administrative changes are announced. See <https://www.uttyler.edu/schedule/files/uttyler-fall-2024-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.**

### **Student Resources:**

Resources to assist you in the course

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Writing Center](#)
- [The Mathematics Learning Center](#)
- [UT Tyler PASS Tutoring Center](#)
- [UT Tyler Supplemental Instruction](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)
- [Robert Muntz Library](#) and [Library Liaison](#)
- [Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)
- Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- LIB 422 -- Computer Lab where students can take a proctored exam
- [The Career Success Center](#)
- [UT Tyler Testing Center](#)
- [Office of Research & Scholarship Design and Data Analysis Lab](#)

Resources available to UT Tyler Students

- [UT Tyler Counseling Center](#) (available to all students)
- [MySSP App](#) (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- [Student Assistance and Advocacy Center](#)
- [Military and Veterans Success Center](#) (supports for our military-affiliated students)
- [UT Tyler Patriot Food Pantry](#)
- [UT Tyler Financial Aid and Scholarships](#)
- [UT Tyler Student Business Services](#) (pay or set up payment plans, etc.)
- [UT Tyler Registrar's Office](#)
- [Office of International Programs](#)
- [Title IX Reporting](#)
- [Patriots Engage](#) (available to all students. Get engaged at UT Tyler.)

### **University Policies and Information**

**Withdrawing from Class**

Students may [withdraw](#) (drop) from this course using the [Withdrawal Portal](#). Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email [enroll@uttyler.edu](mailto:enroll@uttyler.edu) to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully [read the implications for withdrawing from a course and the instructions](#) on using the [Withdrawal portal](#).

Texas law prohibits students from dropping more than six courses during their entire undergraduate career\*. The six courses dropped includes those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance. **CAUTION #1:** Withdrawing before census day does not mean you get a full refund. Please see the [Tuition and Fee Refund Schedule](#). **CAUTION #2:** All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms. **CAUTION #3:** All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. **CAUTION #4:** All veterans or military-affiliated students should consult with the [Military and Veterans Success Center](#).

\* Students who began college for the first time before 2007 are exempt from this law.

### Artificial Intelligence Statement

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy. *Refer to the About This Course section of the UT Tyler Syllabus Module for specific information on appropriate use of AI in your course(s).*

### Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

### Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade *only when all of the following conditions are met*: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

### **Grade Appeal Policy**

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the [Registrar's Form Library](#).

NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

### **Disability/Accessibility Services**

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler/> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage

at <https://www.uttyler.edu/disability-services>, the SAR office located in the Robert Muntz Library, LIB 460, email [saroffice@uttyler.edu](mailto:saroffice@uttyler.edu), or call 903.566.7079."

### **Military Affiliated Students**

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The [Military and Veterans Success Center \(MVSC\)](#) has campus resources for military-affiliated students. The MVSC can be reached at [MVSC@uttyler.edu](mailto:MVSC@uttyler.edu) or via phone at 903.565.5972.

### **Students on an F-1 Visa**

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.
- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

### **Academic Honesty and Academic Misconduct**

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

### **FERPA**

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements to protect your confidential information.

### **Absence for Official University Events or Activities**

This course follows the practices related to [Excused Absences for University Events or Activities](#) as noted in the Catalog.

### **Absence for Religious Holidays**

This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog](#).

### **Absence for Pregnant Students**



This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at [parents@uttyler.edu](mailto:parents@uttyler.edu) and also complete the [Pregnant and Parenting Self-Reporting Form](#).

### **Campus Carry**

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>.