

CHEM 5321 Section 001

Biochemical Foundations and Treatment of Disease Spring 2026

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Office Hours: Monday 9:30-10:30 am, Thursday 2:30-4:30 pm, and by appointment.

Lecture: Monday, Wednesday, and Friday 11:15 am-12:10 am in Soules College of Business (COB) 111.

Text: There is no textbook for this course. Required readings will be provided in the form of review articles, book chapter, or other sources of primary literature through the Canvas webpage for the course.

Course Resources: Canvas webpage will be used to provide required texts and other information.

Course Content:

This course takes an in depth look at the molecular basis of human diseases. The course will start by examining genetics as a starting point for understanding disease and how genetic mutations can lead to changes in the functional materials of the cell, namely proteins. Students will learn how disease is much more complex than merely genetics and learn to delve deeper by looking at epigenetics, nutrition, and the gut microbiome. Modern methods for targeting and treating disease using molecular strategies will be explored in depth. Some diseases that will be discussed include cancer, cystic fibrosis, prion diseases, Alzheimer's disease, and infection by viruses.

Course Learning Objectives:

- Build a foundational understanding of how genetics relates to human disease and how genetic mutations can arise
- Link the genetic basis of disease to the functional changes that result at the molecular level
- Learn how changes in protein sequence modify the function of the protein
- Learn how metabolic, signaling, and other cell processes are impacted by modifications to the proteins that result in disease
- Examine new frontiers in medical science such as epigenetics, gut microbiome, and new ideas that are emerging from the literature
- Evaluate treatment strategies used to combat disease and understand the rational molecular basis for these treatments
- Foster independent literature review and scientific presentation skills

Grade Distribution:

The overall grade will be determined by the student's performance on midterm exams, an individual project that includes a written report and oral presentation, any assigned homework, and a final cumulative exam. Examinations will cover all materials from text, lectures, and any assigned materials. Individual's projects will review a current topic in human disease and discuss the molecular basis for treatments used in combatting the disease topic chosen. Homework sets will reinforce principles discussed in lecture,

providing word-based problems that require students to identify and utilize principles to answer real world problems in faced in disease. The breakdown of these components to your final grade is as follows:

Homework	10%
Individual's Report and Presentation	30%
Midterm Exams (2)	40% (20% each)
Final Exam	<u>20%</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.

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 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 as the instructor sees fit.

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:

Class attendance is required. The instructor must be notified of any expected absences according to 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 26, 2026, and the Last Day to Withdraw is March 30, 2026.

Tentative Lecture Outline

- 01/12/26 Disease: What is it?
- 01/14/26 Role of Genetics in Disease
- 01/16/26 Genetic Mutation

01/19/26 Martin Luther King Jr. --Day No Class

01/21/26 Epigenetic Disease

01/23/26 Environmental/Nurture Induced Disease

01/26/26 Causes vs. Symptoms

01/28/26 The Immune System and Inflammation

01/30/26 The Immune System and Inflammation

02/02/26 Single Gene Mutation Disorder: Sickle Cell Anemia

02/04/26 Single Gene Mutation Disorder: Cystic Fibrosis

02/06/26 Gene Therapy and CRISPR (Topic for Individual Project Due)

02/09/26 Endocrine Disorders (focus on diabetes)

02/11/26 Endocrine Disorders

02/13/26 Endocrine Disorders

02/16/26 Immune System Disorders (Celiac Disease)

02/18/26 Immune System Disorders

02/20/26 Exam 1 (Material covered from 01/13 thru 02/14)

02/23/26 Immune System Disorders

02/25/26 Cancer

02/27/26 Cancer

03/02/26 Cancer

03/04/26 Cancer

03/06/26 Cancer

03/09/26, 03/11/26 and 03/13/26 No Class—Spring Break

03/16/26 Neurological Disorders

03/18/26 Neurological Disorders

03/20/26 Neurological Disorders

03/23/26 Cardiovascular Diseases

03/25/26 Cardiovascular Diseases

03/27/26 Cardiovascular Diseases

03/30/26 Respiratory Diseases

04/01/26 Respiratory Diseases

04/03/26 Respiratory Diseases (Project Report Due)

04/06/26 Respiratory Diseases

04/08/26 Special Topic

04/10/26 Exam 2

04/13/26 UG Group Presentations (2 groups)

04/15/26 UG Group Presentations (2 groups)

04/17/26 UG Group Presentations (2 groups)

04/20/26 UG Group Presentations (2 groups)

04/22/26 UG Group Presentations (2 groups)

04/24/26 UG Group Presentations (2 groups)

04/27/26 Final Exam 10:15am-12:15pm

Final Exam: Monday, April 27, 2026, from 10:15am-12:15pm in regular classroom.
See [Final Exam Schedule | Academic Calendar 25-26 | UT Tyler](#) 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.

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 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 include 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, 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 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 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>.