

CHEM 4344 Section 001 Molecular Basis of Disease Spring 2024

Instructor: Dr. Dustin Patterson

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Office Hours: TBA.

Lecture: Monday, Wednesday, and Friday 11:15 am-12:10 am in Ratliff Building South (RBs), Room 2015.

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 will introduce students to the molecular basis of human diseases. It builds upon the principles learned in the prerequisite introductory biochemistry course (CHEM 4334) to examine the fundamental causes of disease at the molecular level. The course will examine the genetic foundations of disease, how genetic mutations ultimately lead to specific structural and functional changes to the proteins they encode, why changes in protein structure and function lead to the health conditions observed, and modern methods that look to target the molecular basis of the disease to alleviate or cure the problem. The aim of this course is to help students gain a strong understanding of the biochemical basis of diseases, how understanding the biochemical origins can allow us to develop treatment strategies and prepare them to be able to make informed rationally based decisions about disease that will guide them in their professional and personal lives.

Course Learning Objectives:

- Build a foundational understanding of how genetics relates to human disease
- Learn where genetic mutations can arise from
- 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
- Evaluate treatment strategies used to combat disease and understand the rational molecular basis for these treatments
- Foster collaboration and literature research through an assigned group project

Grade Distribution:

The overall grade will be determined by the student's performance on midterm exams, a group 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. Group 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%
Group Report and Presentation	25%
Midterm Exams (2)	40% (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 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.

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.

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 29, 2024 and the Last Day to Withdraw is March 25, 2024.

Tentative Lecture Outline

01/15/24 Martin Luther King Jr. --Day No Class

01/17/24 Disease: What is it?
01/19/24 Role of Genetics in Disease
01/22/24 Genetic Mutation
01/24/24 Epigenetic Disease
01/26/24 Environmental/Nurture Induced Disease
01/29/24 Causes vs. Symptoms
01/31/24 The Immune System and Inflammation
02/02/24 The Immune System and Inflammation
02/05/24 Single Gene Mutation Disorder: Sickle Cell Anemia
02/07/24 Single Gene Mutation Disorder: Cystic Fibrosis
02/09/24 Gene Therapy and CRISPR (Topic for Group Project Due)
02/12/24 Endocrine Disorders (focus on diabetes)
02/14/24 Endocrine Disorders
02/16/24 Endocrine Disorders
02/19/24 Immune System Disorders (Celiac Disease)
02/21/24 Immune System Disorders
02/23/24 Exam 1 (Material covered from 01/17 thru 02/16)
02/26/24 Immune System Disorders
02/28/24 Cancer
03/01/24 Cancer
03/04/24 Cancer
03/06/24 Cancer
03/08/24 Cancer
03/11/24 Neurological Disorders
03/13/24 Neurological Disorders
03/15/24 Neurological Disorders
03/18/24, 03/20/24 and 03/22/24 No Class—Spring Break
03/25/24 Cardiovascular Diseases
03/27/24 Cardiovascular Diseases
03/29/24 Cardiovascular Diseases
04/01/24 Respiratory Diseases
04/03/24 Respiratory Diseases
04/05/24 Respiratory Diseases (Group Project Report Due)
04/08/24 Respiratory Diseases
04/10/24 Special Topic
04/12/24 Exam 2
04/15/24 Group Presentations (2 groups)
04/17/24 Group Presentations (2 groups)
04/19/24 Group Presentations (2 groups)
04/22/24 Group Presentations (2 groups)
04/24/24 Group Presentations (2 groups)
04/26/24 Review for Final

Final Exam: The final exam is comprehensive and will be held at the official time and place specified by the UT Tyler Spring 2024 Final Exam Schedule. This information can

be found on the UT Tyler Spring 2024 Final Exam Schedule. See www.uttyler.edu/registrar/ 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, you are allowed to [withdraw Links to an external site.](#) (drop) from this course through the [Withdrawal Portal Links to an external site.](#). Withdrawing from classes can impact Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please read this page, speak with your instructors, consider your options, and speak with your instructor. UT Tyler faculty and staff are here for our students and often can provide additional support options or student assistance. Please read the implications for withdrawing from a course and the instructions on using the Withdrawal portal on the [Registrar's Withdrawal page Links to an external site.](#). Texas law prohibits students who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at 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 financial aid 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 Links to an external site.](#). CAUTION #2: All international students must check with the [Office of International Programs Links to an external site.](#) 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 Links to an external site.](#)
- **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; this is separate from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy. 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 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. Links to an external site.](#)

- **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> [Links to an external site.](#) 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> [Links to an external site.](#), the SAR office located in the University Center, # 3150, 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 \(MVSC Links to an external site.\)](#) has campus resources for military-affiliated students. The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

- **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](#)

- [Links to an external site.](#) 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 Links to an external site.](#). 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 approved absences as noted by the Student Manual of Operating Procedures ([Sec. 1 -501 Links to an external site.](#)).
- **Absence for Religious Holidays:** This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog Links to an external site.](#)
- **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>.