

## CHEM 4344 Section 001      Molecular Basis of Disease      Spring 2023

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**Office Hours:** Monday 2-3 pm, Tuesday 2-4 pm, and by appointment.

**Lecture:** Monday, Wednesday, and Friday 9:05 am-10:00 am in Ratliff Building North (RBN), Room 4034

**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 23, 2023 and the Last Day to Withdraw is March 23, 2023.

### **Tentative Lecture Outline**

01/9/23 Introduction to disease: What is it?

01/11/23 Role of Genetics in Disease  
01/13/23 Genetic Mutation  
**01/16/23 Martin Luther King Jr. --Day No Class**  
01/18/23 Epigenetic Disease  
01/20/23 Environmental/Nurture Induced Disease  
01/23/23 Causes vs. Symptoms  
01/25/23 The Immune System and Inflammation  
01/27/23 The Immune System and Inflammation  
01/30/23 Single Gene Mutation Disorder: Sickle Cell Anemia  
02/01/23 Single Gene Mutation Disorder: Cystic Fibrosis  
**02/03/23 Gene Therapy and CRISPR (Topic for Group Project Due)**  
02/06/23 Endocrine Disorders (focus on diabetes)  
02/08/23 Endocrine Disorders  
02/10/23 Endocrine Disorders  
02/13/23 Immune System Disorders (Celiac Disease)  
02/15/23 Immune System Disorders  
**02/17/23 Exam 1 (Material covered from 01/10 thru 02/11)**  
02/20/23 Immune System Disorders  
02/22/23 Cancer  
02/24/23 Cancer  
02/27/23 Cancer  
03/01/23 Cancer  
03/03/23 Cancer  
03/06/23 Neurological Disorders  
03/08/23 Neurological Disorders  
03/10/23 Neurological Disorders  
**03/13/23, 03/15/23 and 03/17/23 No Class—Spring Break**  
03/20/23 Cardiovascular Diseases  
03/22/23 Cardiovascular Diseases  
03/24/23 Cardiovascular Diseases  
03/27/23 Respiratory Diseases  
03/29/23 Respiratory Diseases  
**03/31/23 Respiratory Diseases (Group Project Report Due)**  
04/03/23 Respiratory Diseases  
04/05/23 Special Topic  
**04/07/23 Exam 2**  
**04/10/23 Group Presentations (2 groups)**  
**04/12/23 Group Presentations (2 groups)**  
**04/14/23 Group Presentations (2 groups)**  
**04/17/23 Group Presentations (2 groups)**  
**04/19/23 Group Presentations (2 groups)**  
04/21/23 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 2023 Final Exam Schedule. This information can

be found on the UT Tyler Spring 2023 Final Exam Schedule. See [www.uttyler.edu/registrar/](http://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.**

***Information for Classrooms and Laboratories:*** Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its [Honor Code \(Links to an external site.\)](#) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff. Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the [UT Tyler COVID-19 Information and Procedures \(Links to an external site.\)](#) website to review protocols, check symptoms, and report possible exposure. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email [saroffice@uttyler.edu](mailto:saroffice@uttyler.edu).

#### **UT Tyler Honor Code**

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

#### **Students Rights and Responsibilities**

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

#### **Campus Carry**

We respect the right and privacy of students 21 and over 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>

#### **UT Tyler a Tobacco-Free University**

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit [www.uttyler.edu/tobacco-free](http://www.uttyler.edu/tobacco-free).

#### **Grade Replacement/Forgiveness and Census Date Policies**

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.

- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a “W” grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

### **State-Mandated Course Drop Policy**

Texas law prohibits a student 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 another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

### **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 you have 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 Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

The University of Texas at Tyler has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Like so many things this Fall, the need for accommodations and the process for arranging them may be altered by the COVID-19 changes we are experiencing and the safety protocols currently in place. Students with disabilities who may need accommodation(s) in order to fully participate in this class are urged to contact the Student Accessibility and Resources Office (SAR) as soon as possible, to explore what arrangements need to be made to ensure access. During the Fall 2020 semester, SAR will be conducting all appointments via ZOOM. If you have a disability, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student Application. For more information, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices> or call 903.566.7079.

### **Student Absence due to Religious Observance**

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

### **Student Absence for University-Sponsored Events and Activities**

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

### **Social Security and FERPA Statement**

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

### **Emergency Exits and Evacuation**

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor’s directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the

first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

### **Student Standards of Academic Conduct**

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

i. "Cheating" includes, but is not limited to:

- copying from another student's test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

UT Tyler Resources for Students:

- UT Tyler Writing Center (903.565.5995), [writingcenter@uttyler.edu](mailto:writingcenter@uttyler.edu)
- UT Tyler Tutoring Center (903.565.5964), [tutoring@uttyler.edu](mailto:tutoring@uttyler.edu)
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)