Biology 4375/5375 – Molecular Toxicology

11:00am-12:20pm Tues/Thurs
Wooten 114

Fall 2025
Dr. Brianne Soulen
EESAT 320 D (third floor, hang a left)
Brianne.soulen@unt.edu
Office Hours: Tuesday and Thursday before and after class, **By appt**.

Textbook (optional)
Mechanistic Toxicology 2nd Ed. U Boelsterli. Informa Healthcare, USA.
**A digital copy is available through the library website. You can send yourself chapters as needed. **

Course Description
The goal of this course is to introduce students to toxicology at the biochemical and molecular level. This will include covering some basics in toxicology, molecular biology, and physiology. The course will include a discussion of a variety of toxic modes of action, modern techniques used in molecular toxicology, and a discussion of current toxicological research literature. Students will be evaluated based on performance on exams and written assignments.

Grades
Grades will be based on 3 regular exams (60%) and a mock grant proposal (40%). Letter grades will be assigned on the following scale:

90-100% = A
80-89% = B
70-79% = C
60-70% = D
<60% = F

If you do poorly on an exam or are concerned about your grade, I encourage you to come see me. It is much easier to get a student back on track for a good grade earlier in the semester than later.

Regular Exams (60%)
Exams will consist of a mixture of definition, short answer, and essay questions. Three in-class exams will be given over the course of the semester. Students may "fix" one of the regular exam grades and receive "half credit" back on that exam (I will discuss the details of this in class). Undergraduate exams will be curved; graduate students will not. Make-up exams will be allowed in cases of illness, emergency, or conflict with another university-sponsored activity. The student MUST notify the instructor either prior to the exam or within 24 hours of the original exam time. For university sponsored activities, a letter from a coach/sponsor/etc should be provided.

Written Assignments (40%)
Over the course of the semester, each student will write a mock grant proposal. Guidelines/formatting instructions for the proposal will be distributed in class. For graduate students, the proposal should detail either some area within your own research or an extension of your research. For undergraduate students, the proposal should be

based on something you are interested in, have seen in the news, etc. Dr. Soulen will help you narrow down a topic as needed. The proposal should include **at least one molecular-mechanistic endpoint**. The grade breakdown for the proposal will be:

Graduate Students
10% - General topic/idea – due Sept. 5 through email or Canvas message by 11:59 pm
10% - Draft Specific Aims page – due Sept. 30 through Canvas by 11:59 pm
15% - Complete draft of written product- due Nov. 22 through Canvas by 11:59 pm
25% - PowerPoint presentation to class – in class Dec. 2, 4
40% - Final written product – due Dec. 6 through Canvas by 11:59 pm

Undergraduate Students
10% - General topic/idea – due Sept. 5 through email or Canvas message by 11:59 pm
12.5% - Draft Specific Aims page – due Sept. 30 through Canvas by 11:59 pm
12.5% - Draft of introduction- due Oct. 24 through Canvas by 11:59 pm
12.5% - Draft of methods- due Nov. 9 through Canvas by 11:59 pm
12.5% - Draft of expected outcomes- due Dec. 2 through Canvas by 11:59 pm
15% - Presentation Summary and Feedback – in class Dec. 2,4
25% - Final written product – due Dec. 6 through Canvas by 11:59 pm

Extra Credit: A total of 9 points of extra credit will be offered throughout the semester.

Lecture and Exam Schedule

Dates	Topic
Aug. 19	Course Introduction
Aug. 21	Science of Toxicology
Aug. 26	Toxic Responses/Mock Grant Proposal
Aug. 28, Sept. 2	Cellular Transport
Sept.4, 9	Phase 1-2 Metabolism
Sept. 11	Guest Lecture
Sept. 16	Review 1
Sept. 18	**Exam 1**
Sept. 23, 25	Oxidative Stress
Sept. 30, Oct. 2	Calcium Homeostasis
Oct. 7, 9	Necrosis-Apoptosis-Repair
Oct. 14	Review 2
Oct. 16	**Exam 2**
Oct. 21	Covalent Binding
Oct. 23	Protein Inactivation
Oct. 28	Ion Transporters
Oct. 30, Nov. 4	Nuclear Receptors
Nov. 6, 11	Immune Toxicity
Nov. 13	Guest Lecture
Nov, 18	Review 3
Nov. 20	**Exam 3**
Nov. 25, 27	Thanksgiving Holiday
Dec. 2	Grad Presentations
Dec. 4	Grad Presentations/Guest Lecture
Dec. 6	**Final Mock Grant Proposal Due**