

CHEM 5640
Special Topics in Organic Chemistry
Time: Tuesday, Thursday 9:30 AM – 10:50 AM
Location: CHEM 352

FALL 2025

INSTRUCTOR

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OFFICE HOURS

Tuesday, Thursday 11:30 – 1:00 PM, or by appointment (**SRB 248**)
Office hours give you the chance to ask for clarification and get help with understanding class material. I strongly encourage you to take advantage of this opportunity. Your success is my priority!

HOW TO REACH ME

Email is the best way to reach me. If your question requires a detailed discussion, please come to my office during scheduled office hours.

COURSE DESCRIPTION

In this course, we will explore the fundamental principles of drug discovery and development. We will delve into the molecular basis of drug design, mechanisms of drug action, structure-activity relationships, and the properties that determine a compound's suitability as a drug. We will also cover topics such as molecular modeling, drug screening, target identification, lead discovery, and optimization. By the end of the course, students will be prepared to pursue advanced studies in medicinal chemistry, drug discovery, and drug development, with a solid understanding of research in these areas.

COURSE GOALS AND LEARNING OBJECTIVES

To develop a deep understanding of the chemical principles underlying drug action and the processes involved in drug discovery and development. To develop critical thinking skills for analyzing and solving real-world pharmaceutical challenges.

At the end of the course, students will be able to:

1. Demonstrate a thorough understanding of the chemical principles behind drug structure, including functional groups, stereochemistry, and how these influence drug-receptor interactions.
2. Explain the biochemical mechanisms through which drugs exert their effects, including enzyme inhibition, receptor agonism/antagonism, and signal transduction pathways.
3. Analyze and predict how modifications to a drug's chemical structure can affect its pharmacological activity, including potency, selectivity, and side effect profiles.

4. Understand the absorption, distribution, metabolism, and excretion (ADME) of drugs, and how these processes influence drug design and therapeutic efficacy.
5. Apply principles of medicinal chemistry to design and optimize drug candidates, focusing on improving efficacy, reducing toxicity, and enhancing drug-like properties.
6. Integrate concepts from organic chemistry, biochemistry, and pharmacology to develop a holistic understanding of the drug discovery process and the role of medicinal chemistry in the broader context of pharmaceutical sciences.
7. Understand the application of advanced drug discovery methods, including high-throughput screening, combinatorial chemistry, and rational drug design in the pharmaceutical industry.

COURSE MATERIALS

Textbook: An Introduction to Medicinal Chemistry; Graham L. Patrick; 7th Edition.

Supplementary Materials: Selected chapters from Lehninger Principles of Biochemistry; Nelson and Cox; 6th, 7th, or 8th Edition, Selected Journal Articles.

Expectations: Reading selected chapters of the text will help you better understand the material. Not all the text will be covered in class, but relevant topics that will improve your understanding will be emphasized.

CLASS POLICIES

Announcements

All out-of-class announcements will be by email or via Canvas, and you are expected to check these on a regular basis.

Attendance Policy

Class attendance is not mandatory, however, research has shown that students who attend class are more likely to be successful. You should endeavor to attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (<https://policy.unt.edu/policy/06-039>). Your safety and well-being are important to me, so if you cannot attend a class due to an emergency, please let me know. If you will miss several classes for any reason (e.g., sickness, travel, interview or athletics) make me aware of this.

Classroom Conduct

Students are expected to maintain a respectful learning environment that supports both their classmates' ability to learn and the instructor's ability to teach. Disruptive behavior will not be tolerated. All cell phones, pagers, and other electronic devices must be silenced during class. Laptops, tablets, and phones may be used only for activities directly related to the class.

Tests and Examinations

Your grade will be determined by **weekly tests**, a **mid-term exam**, and a **final exam**.

Weekly Tests: Each weekly test will have two parts:

1. **In-Class Section:** Multiple-choice/true-false questions given during the last 15–20 minutes of the first class of the week. These tests will require the use of **LockDown Browser**, and once you begin, you may not leave the room and return.

2. **Take-Home Section:** Open-ended questions assigned the same day as the in-class section and due by **11:59 pm on Friday** of the same week. Weekly tests will primarily cover material from the previous week's chapters, but related content from earlier weeks may be included. Your **two lowest weekly test grades** will be dropped.

Midterm and Final Exams: Both are comprehensive and will include multiple-choice and open-ended questions.

Late/Overtime Policy: Exceeding the allotted time for a test or assignment will result in **up to a 30% deduction**. Submissions after the due date will incur a **50% deduction**.

Missed Tests: Missed tests and examinations will receive a grade of zero. If you will be absent, notify me in advance. If you have a valid reason, alternative arrangements will be made.

Paper Critique and Presentations: You will be required to critique a medicinal chemistry article of your choice and give a **5–10 minute in-class presentation**. This will account for 10% of your overall grade.

Additional instructions for tests and examinations will be provided as needed.

Point Distribution

Weekly Tests (10): 70

Mid Term Exam: 10

Final Exam: 10

Student Presentation: 10

Total: 100

Grading Scale

A = 90-100

B = 80-89

C = 70-79

D = 60-69

F = 0-59

Technology Requirements

This course has digital components. To fully participate in this class, students will need a laptop computer and internet access to reference content on the **Canvas Learning Management System**. A laptop computer will also be required for in-class tests on canvas as well as some in-class exercises. Instructions on how to access additional required software will be provided. If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at Learn Anywhere (<https://online.unt.edu/learn>).

Academic Integrity

According to UNT Policy 06.003, Student Academic Integrity, academic misconduct means the intentional or unintentional action by a student to engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, sabotage, and use of AI tools to complete assignments. A finding of academic misconduct may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Disability Accommodation

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (<https://studentaffairs.unt.edu/office-disability-access>). You may also contact ODA by phone at (940) 565-4323.

Academic Success Resources

UNT strives to offer a high-quality education in a supportive environment where you can learn, grow, and thrive. As a faculty member, I am committed to supporting you, and I want to remind you that UNT offers a range of mental health and wellness services to help maintain balance and well-being. Utilizing these resources is a proactive way to support your academic and personal success. To explore campus resources designed to support you, check out [mental health services](https://clear.unt.edu/student-support-services-policies) (<https://clear.unt.edu/student-support-services-policies>), visit unt.edu/success, and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu.

Inclusion

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom's habits of engagement and I also encourage you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (<https://policy.unt.edu/policy/07-012>).

Eagle Alert and Calendar Change

If UNT closes due to weather or emergency, you will be notified through Eagle Alert. The course schedule may be subject to change.

SCHEDULE

Class Schedule

Week	Dates	Topic
1	08/18 – 08/22	Course Introduction and Fundamentals Overview of Drugs and Drug Targets
2	08/25 – 08/29	Protein Structure and Function
3	09/01 – 09/05	Protein Structure and Function Enzyme Structure and Function
4	09/08 – 09/12	Enzyme Kinetics Enzymes as Drug Targets
5	09/15 – 09/19	Receptors and Signal Transduction Receptors as Drug Targets

6	09/22 – 09/26	Nucleic Acid Structure and Function Nucleic Acids as Drug Targets
7	09/29 – 10/03	Miscellaneous Drug Targets Pharmacokinetics and Related Topics
8	10/06 – 10/10	Pharmacokinetics and Related Topics
9	10/13 – 10/17	Drug Discovery: Finding a Lead Compound Drug Design: Optimizing Drug Interactions
10	10/20 – 10/24	Drug Design: Optimizing Access to the Target Getting the Drug to the Market
11	10/27 – 10/31	Synthetic and Computational Approaches in Medicinal Chemistry
12	11/03 – 11/07	Selected Topics: Carbohydrate and Glycosaminoglycans
13	11/10 – 11/14	Selected Topics: Opioid Analgesics, Cardiovascular Drugs
14	11/17 – 11/21	Selected Topics: Anticancer, Antiviral, Antibacterial Agents
15	11/24 – 11/28	Fall Break (No Classes)
16	12/01 – 12/04	Revision and Graduate Student Presentations
17	12/09	Final

Tentative Test/Examination Schedule

Test/Examination	Dates	
	In-Class	Take-Home (Due)
1	08/26	08/29
2	09/02	09/05
3	09/09	09/12
4	09/16	09/19
5	09/23	09/26
6	09/30	10/03
7	10/07	10/10
Mid-Term	10/14	10/17
8	10/21	10/24
9	10/28	10/31
10	11/04	11/07
11	11/11	11/14
12	11/18	11/21
Student Presentations	12/04	
Final	12/09	

Honor Code: “I commit myself to honor, integrity, and responsibility as a student representing the University of North Texas community. I understand and pledge to uphold academic integrity as set forth by UNT Student Academic Integrity Policy, 06.003 (<https://policy.unt.edu/policy/06-003>). I affirm that the work I submit will always be my own, and the support I provide and receive will always be honorable.”

Name:

Signature:

Date: