



CHEM 4670
Special Topics in Organic Chemistry
Location: CHEM 352
FALL 2026

INSTRUCTOR

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CLASS TIMES

Tuesday, Thursday 9:35 AM – 10:55 AM

OFFICE HOURS

Tuesday, Thursday 11:15 AM – 12:15 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 (Daniel.Afosah@unt.edu). I typically respond to emails within 48 hours on Weekdays. If your question requires a detailed discussion, please come to my office during scheduled office hours. All out-of-class announcements will be shared via Canvas. Be sure to set up your Canvas page so that you receive push notifications of changes made to the page.

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. Explain the chemical principles underlying drug structure, including functional groups and stereochemistry, and how these features 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. Explain the principles of drug absorption, distribution, metabolism, and excretion (ADME) and predict how these processes influence drug design and therapeutic efficacy.

5. Apply medicinal chemistry principles to design and optimize drug candidates with improved efficacy, reduced toxicity, and enhanced 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. Explain and evaluate 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 sections that will improve your understanding will be emphasized.

CLASS POLICIES

Announcements

Important course information, reminders, schedule changes, and other updates may be announced during class. All out-of-class announcements will be communicated by email or through Canvas. You are expected to check your email and Canvas regularly for course updates.

Attendance Policy

Research has shown that students who attend class are more likely to be successful, therefore 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>). Class attendance will be taken and there will be group activities that will count towards your participation grade. 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. It is important that you communicate with me prior to being absent, we can discuss and mitigate the impact of the absence on your attainment of course learning goals. Your success, safety, and well-being are important to me!

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. Classes will begin and end at the times listed in the syllabus. If you arrive late or need to leave early, please sit near the door to minimize disruption. All cell phones and electronic devices must be silenced during class. Laptops, tablets, and phones may be used only for activities directly related to the course. The use of social media, texting, internet browsing, videos, phone conversations, sleeping, or side conversations during class is prohibited.

Headphones or earbuds (including AirPods, wired, or Bluetooth) are not permitted in lecture or recitation unless approved as an accommodation. Students requiring accommodations should work with the Office of Disability Access (<https://studentaffairs.unt.edu/office-disability-access>) and notify the instructor once documentation is in place.

Students who engage in disruptive behavior may be asked to leave class immediately and may be suspended for up to one week for a first offense, with longer suspensions for repeated

violations. Recording or photographing the instructor or course materials without explicit permission is prohibited. The Code of Student Conduct is available at [Dean of Students | University of North Texas](#).

Course Assessment

Your grade will be determined by in-class quizzes and group activities, take-home assignments, three in-term examinations, an in-class presentation, and a final examination.

Examinations

All examinations will be administered in class and will consist of two sections: multiple-choice and/or true-false questions and open-ended questions.

1. In-Term Examinations

The in-term examinations will be up to **80 minutes long**. Exam 1 will cover material introduced from the beginning of the course through the first examination, while subsequent examinations will primarily cover material introduced since the previous examination. Relevant concepts from earlier portions of the course may also be included on any exam

2. Final Exam

The final exam is an up to **80-minute cumulative exam** covering all course content and will be administered on the scheduled date listed above. Students must complete the exam within the designated testing window, with no exceptions.

If the final exam score is higher than the lowest in-term examination score, the final exam score will replace that lowest in-term examination score. In this case, the final exam score will count twice: once as the final exam grade and once as the replacement for the lowest in-term examination grade. Additional details will be provided during the semester.

Late Work

Late submission of assigned coursework will incur a 25% deduction for each day the submission is late, except in cases of university-excused absences or extremely extenuating circumstances, as determined by the instructor. Students must notify the instructor as soon as possible if circumstances arise that may affect their ability to meet a deadline. The instructor reserves the right to determine the validity of all requests for late submissions. Under rare and extenuating circumstances, extensions or alternative arrangements may be granted at the instructor's discretion. Limited accommodations may be provided in accordance with guidance from the Office of the Dean of Students for matters typically handled by that office, including religious observances and serious personal or family circumstances. For foreseeable absences, such as religious holidays, scheduled medical procedures, medical appointments, or work-related travel, students are required to notify the instructor at the beginning of the semester or as soon as the conflict becomes known. Requests made on the day of, or after, a missed deadline for foreseeable absences will not be granted.

Missed Examinations

Missed examinations will receive a grade of zero. If you expect to be absent, notify me in advance. Students who miss an examination for a valid, documented reason will be given a make-up examination.

Paper Critique and Presentation

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 quizzes, assignments, and examinations will be provided as needed. Practice questions will also be provided to help you prepare for examinations.

Point Distribution

In class Quizzes: **5**

Take-home Assignments (3): **15**

In-term Examinations (3): **60**

Final Exam: **20**

Paper Critique and Presentation: **10**

Total: 110

Grading Scale

A: $\geq 90\%$

B: $80\% - <90\%$

C: $70\% - <80\%$

D: $60\% - <70\%$

F: $<60\%$

Unauthorized Aids During Examinations and Assessments

Students may use only those materials and resources that are expressly authorized by the instructor for a particular examination or assessment. Touching, holding, or accessing any unauthorized aid during the examination period constitutes a violation of the Student Code of Conduct, regardless of whether the aid is used.

Any item that may be considered an unauthorized aid must be kept out of view and in a closed container (e.g. zipped backpack, buttoned purse, etc.) during the entirety of the examination or assessment.

Unless specifically authorized in writing by the instructor, prohibited aids include, but are not limited to:

- Mobile phones and smartphones
- Smartwatches and fitness trackers with communication, recording, or internet capabilities
- Tablets, laptops, and other computing devices
- Earbuds, headphones, and other audio devices
- Smart glasses, cameras, recording devices, and wearable technology
- Artificial intelligence (AI) tools, chatbots, and other generative AI technologies
- Notes, textbooks, study guides, formula sheets, or reference materials
- Any other device, material, or resource not expressly permitted by the instructor

Students are responsible for clarifying any questions about permitted materials before the examination begins.

Technology Requirements

This course includes digital components. To fully participate, students must have access to a laptop computer and reliable internet to engage with course content, assessments, and in-class activities delivered through the Canvas Learning Management System. The course will also utilize iClicker for in-class participation and engagement. Students must have access to speakers and a microphone, required plug-ins, and the Microsoft Office Suite, and must meet Canvas technical requirements as outlined at: <https://clear.unt.edu/supported-technologies/canvas/requirements>. Instructions for accessing any additional required software will be provided, and students will be notified of any changes to technical requirements. Guidance on succeeding in a digital learning environment is available through Learn Anywhere at: <https://online.unt.edu/learn>.

iClicker

Engagement, participation, and interaction in class are essential components of the learning process and will count toward your final grade. This course will use **iClicker**; therefore, each student must be registered and have a compatible device (computer, smartphone, or tablet) available for polling during class.

You may participate using:

- The **iClicker Student App** (iOS/Android)
- The **iClicker Website** (iclicker.com)
- An **iClicker Device**

When setting up your account, select **University of North Texas** as your institution and enter your **EUID** (Canvas login ID) in the *Student ID* field. Add this course to your list; it will appear each time you log in. Join the session at the start of class—connecting to UNT Wi-Fi is recommended. Your iClicker participation counts toward your engagement grade. If you miss class, you miss that day's points; no make-ups will be given except in approved circumstances.

iClicker is to be used only for your own participation while present in class. Submitting responses for another student, having someone respond for you, or answering when absent is considered academic dishonesty and will be treated accordingly.

Academic Integrity

Academic integrity is expected in all aspects of this course. Academic misconduct is any intentional or unintentional action by a student that violates the principles of academic integrity. This includes, but is not limited to, cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, sabotage, and the unauthorized use of artificial intelligence (AI) tools, chatbots, or other generative AI technologies to complete graded coursework. Unless otherwise stated, all assignments, examinations, and other graded work must reflect your own work.

Academic misconduct will be addressed in accordance with UNT Policy 06.003, Student Academic Integrity. Students are responsible for reviewing this policy and understanding the University's expectations, definitions, and procedures regarding academic integrity.

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. A list of other support services available to students is provided below.

- Student Health and Wellness Center (<https://studentaffairs.unt.edu/student-health-and-wellness-center>)
- Counseling and Testing Services (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- UNT Care Team (<https://studentaffairs.unt.edu/care>)
- UNT Psychiatric Services ([Psychiatry | University of North Texas](https://psychiatry.unt.edu))
- Individual Counseling ([Individual Therapy | University of North Texas](https://individualtherapy.unt.edu))
- Registrar (<https://registrar.unt.edu/registration>)
- Financial Aid (<https://financialaid.unt.edu/>)
- Student Legal Services (<https://studentaffairs.unt.edu/student-legal-services>)
- Career Center (<https://studentaffairs.unt.edu/career-center>)
- Multicultural Center (<https://edo.unt.edu/multicultural-center>)
- Counseling and Testing Services (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- Pride Alliance (<https://edo.unt.edu/pridealliance>)
- UNT Food Pantry (<https://deanofstudents.unt.edu/resources/food-pantry>)
- Academic Resource Center (<https://clear.unt.edu/canvas/student-resources>)
- Academic Success Center (<https://success.unt.edu/asc>)
- UNT Libraries (<https://library.unt.edu/>)
- Writing Lab (<http://writingcenter.unt.edu/>)
- MathLab ([Math Lab | University of North Texas](https://mathlab.unt.edu))
- Chemistry Resource Center (CRC) ([Instructional Resources | University of North Texas](https://instructionalresources.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>).

Course Evaluation

Student Perceptions of Teaching (SPOT) is UNT's official course evaluation system and gives students the opportunity to confidentially provide constructive feedback to their instructor and department. Student feedback plays an important role in improving teaching effectiveness, course design, and the overall learning experience, and students are strongly encouraged to participate.

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.

HOW TO SUCCEED IN THIS COURSE

Success in this course depends on consistent engagement and active participation. Because Medicinal Chemistry is cumulative, each topic builds upon concepts introduced earlier, missing

even one lecture can make later material more challenging to grasp. To give yourself the best chance of success:

- Attend every class and recitation
- Review lecture slides before class and take detailed notes during the lecture.
- Ask questions during class or email me if something is unclear.
- Complete all assignments on time.
- Use office hours
- Study regularly
- Form study groups

SYLLABUS CHANGE POLICY

If any aspect of this course changes, an updated syllabus will be posted on Canvas. In addition, a Canvas announcement will be made and, when possible, the change will also be communicated verbally during class.

TENTATIVE SCHEDULE

Week	Date	Topic
1	Tu, 8/18	Course Introduction and Fundamentals
	Th, 8/20	Overview of Drugs and Drug Targets
2	Tu, 8/25	Protein Structure and Function
	Th, 8/27	Protein Structure and Function
3	Tu, 9/1	Enzyme Structure and Function
	Th, 9/3	Enzyme Kinetics
4	Tu, 9/8	Enzymes as Drug Targets
	Th, 9/10	Receptors and Signal Transduction
5	Tu, 9/15	Receptors as Drug Targets
	Th, 9/17	Exam 1
6	Tu, 9/22	Nucleic Acid Structure and Function
	Th, 9/24	Nucleic Acids as Drug Targets
7	Tu, 9/29	Miscellaneous Drug Targets
	Th, 10/1	Pharmacokinetics and Related Topics
8	Tu, 10/6	Pharmacokinetics and Related Topics
	Th, 10/8	Pharmacokinetics and Related Topics
9	Tu, 10/13	Drug Discovery: Finding a Lead Compound
	Th, 10/15	Exam 2
10	Tu, 10/20	Drug Design: Optimizing Drug Interactions
	Th, 10/22	Drug Design: Optimizing Access to the Target
11	Tu, 10/27	Getting the Drug to the Market
	Th, 10/29	Synthetic and Computational Approaches in Medicinal Chemistry
12	Tu, 11/3	Synthetic and Computational Approaches in Medicinal Chemistry
	Th, 11/5	Selected Topics: Carbohydrates and Glycosaminoglycans
13	Tu, 11/10	Selected Topics: Cardiovascular Drugs: Anticoagulants
	Th, 11/12	Exam 3
14	Tu, 11/17	Selected Topics: Opioid Analgesics
	Th, 11/19	Selected Topics: Anticancer Agents
15	Tu, 11/24	Fall Break, No Classes
	Th, 11/26	
16	Tu, 12/1	Revision
	Th, 12/3	Revision/Student Presentations
16	Th, 12/10	Final

TENTATIVE EXAMINATION SCHEDULE

Assessment	Type	Release Date	Due/Exam Date	Points	% of Final Grade
Assignment 1	Take-Home	Tu, 09/08	Mo, 09/14	20	5
Exam 1	In-Class		Th, 09/17	100	20
Assignment 2	Take-Home	Tu, 10/06	Mo, 10/12	20	5
Exam 2	In-Class		Th, 10/15	100	20
Assignment 3	Take-Home	Tu, 11/03	Mo, 11/09	20	5
Exam 3	In-Class		Th, 11/12	100	20
Final Exam	In-Class		Th, 12/10	100	20

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:

The descriptions and timelines outlined in this document are subject to change.