CHEM 334: Organic Chemistry I Lecture

Fall Semester 2025

Class Meeting Times: Mo/We/Fr, 10:00 AM – 10:50 AM in SC 2123

Instructor: Dr. Keith P. Reber
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Office: SC 4301J (office hours held in SC 4335)
Office Hours: Monday (1:00 – 2:00 PM); Tuesday (9:00 – 10:00 AM); Thursday (1:00 – 2:00 PM)
Course Website: https://blackboard.towson.edu

Course catalog description:

Structure, stereochemistry, reactions and their mechanisms, preparation and properties of alkanes, alkenes, alkynes, alkyl halides and alcohols. Three lecture hours. CHEM 334 and CHEM 337 comprise a traditional two-term organic chemistry lecture sequence with the CHEM 336 and CHEM 339 labs. Not open to students who have successfully completed CHEM 331. Prerequisites: CHEM 132 and CHEM 132L.

Information about organic chemistry courses at TU:

Students are strongly encouraged to enroll in the organic chemistry course(s) that best align with their academic degree requirements and ultimate career goals. The only programs that require CHEM 334 are chemistry, forensic chemistry, and the biochemistry track within the MB3 major. The alternative is CHEM 333/333L, which is a one-semester (5 credit) combined organic chemistry lab/lecture course intended for biology majors. This course gives a broader overview of organic chemistry, focusing only on the most important concepts needed for biochemistry. **Note that CHEM 333/333L satisfies the graduation requirements for every track within the biology major, and this course also satisfies the prerequisite for taking biochemistry (CHEM 351).**

Required course materials:

- CHEM 334 course packet (available at the Towson University Store)
- *Organic Chemistry* (5th Edition) by Maitland Jones, Jr. and Steven Fleming, W. W. Norton & Company, with online access to Smartwork5 [Note that your bursar account will be automatically charged for these resources through direct access (https://towsonustore.com/SiteText?id=34434) unless you opt out.]

Recommended course materials:

- *Study Guide and Solutions Manual for Organic Chemistry* (5th edition) by Maitland Jones, Jr., Henry Gingrich, and Steven Fleming, W. W. Norton & Company, ISBN: 0393936597
- *Preparing for Your ACS Examination in Organic Chemistry*, ISBN: 1732776415

Organic chemistry requires strong spatial reasoning skills, and it's important for you to be able to visualize molecules in three dimensions. **Although a molecular modeling kit is not required for this course, it is strongly recommended**. Although any standard organic modeling set can be used successfully in this course, here are my preferred modeling kits for CHEM 334/337:

- HGS Stereochemistry 4010 Alpha Molecular Model Set, https://www.amazon.com/n/dp/0999722425/
- Mega Molecules Organic Chemistry Molecular Model Set, https://a.co/d/2JYgpkq

Course overview:

"Organic chemistry just now is enough to drive one mad. It gives me the impression of a primeval forest full of the most remarkable things, a monstrous and boundless thicket, with no way of escape, into which one may well dread to enter."

– Friedrich Wöhler (1835)

Although the pioneering organic chemist Friedrich Wöhler expressed the above sentiment over 175 years ago, I believe it accurately describes the feelings of many of today's students. Organic chemistry has a notorious reputation for being a difficult course and seems to cause students a great deal of anxiety. So why study chemistry at all (and organic chemistry in particular)? Chemistry is unique among the physical sciences in that it gives its practitioners the opportunity *to create* instead of simply *to study*. This is especially true of organic chemistry, which has produced medicines, dyes, flavorings, fuels, solar cells, and countless other products that shape our modern world. It is also important to recognize the vital role that organic chemistry plays in understanding biological systems, which is particularly relevant for those interested in careers in medicine or physiology.

Learning outcomes:

CHEM 334 is the first course in a two-semester sequence that provides an introduction to the theory and practice of organic chemistry. At the end of CHEM 334, students will be able to:

1. Understand different theories of bonding in organic compounds, including Lewis/Kekulé structures, hybridization, valence bond theory, molecular orbital theory, and resonance.
2. Identify factors that determine the physical properties of organic molecules (i.e. melting point, solubility, density, dipole moment, acidity/basicity, etc.).
3. Systematically name alkanes, halides, alkenes, alkynes, alcohols, and ethers according to IUPAC rules.
4. Use the concepts of isomerism and stereochemistry to determine the relationships between organic molecules and understand their three-dimensional structures.
5. Apply their knowledge of kinetics and thermodynamics to understand reaction rates and the changes in energy/entropy that accompany organic reactions.
6. Use the curved arrow formalism to draw reaction mechanisms that accurately depict changes in bonding.
7. Predict the products of organic reactions by recognizing the characteristic properties of functional groups.
8. Design multi-step synthetic sequences to prepare target molecules of interest.

Course Information

A. Attendance:

Attendance in lecture is not mandatory, and prior notification is not required when students miss lectures. However, students are responsible for turning in assignments on or before their listed due dates if they choose not to attend that day's lecture. **No make-up exams will be given.** Should you miss an exam without a university-approved documented excuse, a grade of ZERO will be recorded. If a student misses one of the midterm exams with a documented excuse, then they will receive no score for that particular exam, and their remaining midterm exam scores will be scaled to constitute 60% of their final grade. If you know that you will miss an exam due to an excused absence, I must be notified two weeks in advance, and appropriate signed and dated documentation must be provided. Please see http://catalog.towson.edu/undergraduate/academic-policies/class-attendance-absence-policy/ for the Towson University policy regarding excused absences.

B. Reading assignments:

Approximate reading assignments corresponding to chapters in the 5th edition of the Jones textbook are provided for each lecture on the accompanying course schedule. It is highly recommended that you complete the reading assignments **before** the lecture in which those topics will be discussed. You may also find it helpful to re-read the relevant sections of the textbook **after** lecture in order to identify any concepts that are still unclear**. It is extremely important that you do not fall behind in either the reading assignments or in understanding the lecture material**! Organic chemistry is cumulative, and it becomes increasingly difficult to catch up as the semester progresses. This is not the type of class that you can easily cram for right before an exam; if you find yourself falling behind or struggling with the material in any way, please see me ASAP!

C. Problem sets:

To provide you with additional opportunities for problem solving, I will assign weekly problem sets throughout the semester. Problem sets will be posted on Blackboard approximately one week in advance of their due dates and will focus on material covered during the previous week. **Each problem set will be due at the beginning of lecture on the date indicated on the course schedule.** I will post a detailed answer key for each problem set, and the graded problem sets will be returned during class or available for you to pick up during office hours.

Each problem set will be worth 20 points. I will randomly select a few problems to grade for accuracy (16 points) and assign a score for completion (up to 4 points), i.e. making a reasonable attempt to answer all of the questions. At the end of the semester, the combined scores from the ten problem sets will be counted out of 200 points. Note that problem sets are designed to test your understanding of material you have already learned – they are not where you should be learning the material for the first time. As such, problem sets should be attempted under exam conditions (i.e. no notes, no textbook, no devices or internet, approximately one hour). **Since problem sets are graded assignments, they must be completed individually – working with other students or asking for help from tutors is not permitted.** Directly copying someone else's work (or allowing your work to be copied) will result in a grade of ZERO for that problem set and submission of an academic integrity violation to the Office of Student Accountability and Restorative Practices.

D. Online Practice Problems:

Additional practice problems will be available through the Smartwork5 interactive online assessment platform associated with your textbook. These assignments will serve as a review of the topics covered during each lecture and will be particularly helpful as you prepare for the midterm exams. Although these assignments will not be graded for credit, they will provide you with immediate feedback about your understanding of the course material. You are strongly encouraged to begin working on the online practice problems as soon as the relevant topics have been covered in lecture.

E. Homework problems from the textbook:

The only way to truly learn organic chemistry is to work through problems. Organic chemistry is all about pattern recognition, and you must work through enough examples to recognize those patterns. **Although I will not grade homework problems from the textbook, I expect that you will be working through these problems on your own.** If you're having trouble solving any of the problems or can't understand a particular solution, please send me an e-mail, ask me about it before or after class, come to my office hours, ask a friend, or visit the tutoring center.

Struggling with problems is good – even if it takes you 5 minutes or 15 minutes or 30 minutes to solve a particular problem, I guarantee that you'll remember how you solved it. **One of the biggest mistakes that students make when learning organic chemistry is to equate solving a problem with understanding the solution to a problem.** Put another way, just because you can read and understand the answer presented in the answer key doesn't mean that you'll be able to solve the problem yourself in an exam situation. There is no substitute for solving problems yourself, so I recommend giving each problem your best individual effort – even if it means struggling with it for some time – before talking to anyone else.

F. Exams:

This course will have **three** midterm exams; each will be worth 200 points and will be administered in SC 2133 during your regularly scheduled lecture time according to the following schedule:

- **EXAM 1**: Monday, September 29 (focusing on material from problem sets 1–3)
- **EXAM 2**: Monday, October 27 (focusing on material from problem sets 4–6)
- **EXAM 3**: Monday, December 1 (focusing on material from problem sets 7–9)

Each exam will primarily focus on material covered in lecture since the previous exam. However, since organic chemistry is cumulative, **concepts and reactions covered earlier in the course may appear on exams throughout the semester**. There will also be a cumulative ACS Organic Chemistry final exam (multiple choice format) worth 200 points administered during the scheduled final exam period:

- **FINAL EXAM**: Monday, December 15, 8:00 AM – 10:00 AM in SC 2123

The use of any unauthorized written or electronic resources during an exam is prohibited. If I make a mathematical error when totaling your points on any exam, please bring it to my attention, and I will adjust your score. In general, I will not consider individual re-grades of exam questions unless you are clearly entitled to additional points based on the posted answer key.

G. Grading:

Your final grade in this course will be determined based on your total score out of a possible 1000 points:

- 200 points from problem sets
- 600 points from midterm exams (three exams, each worth 200 points)
- 200 points from the ACS Organic Chemistry final exam

The correlation between point totals and final letter grades is given in the following table; note that (+)/(–) grade cutoffs will only be determined at the end of the semester after examining the overall grade distribution.

Total Points	Letter Grade
900 – 1000	A
	A-
800 – 899	B+
	B
	B-
700 – 799	C+
	C
600 – 699	D+
	D
0 – 599	F

It is very important to me that the grading process is entirely transparent and that all students feel as though they have been treated fairly. I would like to emphasize that I do not have a pre-determined percentage of A's, B's, etc. that I intend to assign at the end of this course. Your grade is determined solely based on how many points you earn and is completely independent from the performance of your classmates. Since there is no traditional "curve," **you are not competing with each other for grades; you are only competing against the material.** Individual exam scores will not be adjusted; however, if I determine that the overall class average is too low at the end of the semester, I will add a fixed number of points to everyone's score to shift the average to a more appropriate level. Note that this can only improve your score, and you will never receive a lower grade than that which you would have received based on earned points alone.

H. Undergraduate Learning Assistants (ULAs):

This course has three ULAs (Dayannara Alvarado, Lucas Hoffman, and Muhammed Khan) who will hold weekly review sessions. Although the ULAs are an excellent resource for providing additional help with understanding course topics, they will not discuss any questions from the problem sets before the assignments are graded.

General Policies

A. Academic integrity:

"The acquisition, sharing, communication, and evaluation of knowledge is at the core of a university's mission. To realize this part of its mission, a university must be a community of trust. Because integrity is essential to the purpose of an academic community, the responsibility for maintaining standards of integrity is shared by all members of that academic community."

https://www.towson.edu/about/administration/policies/03-01-00-student-academic-integrity-policy.html

I expect that all students taking this course will uphold the university's principles concerning academic integrity. Potential violations include, but are not limited to: (1) plagiarizing from written or online sources, (2) directly copying homework answers from other students (or allowing your answers to be copied), (3) soliciting or posting answers on websites such as Chegg or Course Hero, (4) soliciting or posting answers on a group chat, (5) cheating on exams, either by copying answers from another student during the exam or using unauthorized resources, (6) submitting answers from generative AI programs such as ChatGPT and (7) altering graded exams or assignments. Note that I reserve the right to photocopy or scan all graded course materials. Should any of these infractions occur, a grade of ZERO will be given to all persons involved, and an academic integrity violation will be submitted to the Office of Student Accountability and Restorative Practices.

B. Chemistry department statement on classroom diversity:

The students, faculty, and staff at Towson University represent a diverse and vibrant community of learners and scholars. As a community, we value the unique contributions of each individual and promote active participation in all aspects of the learning process by each community member. Your instructor supports Towson University's goal of fostering a diverse and inclusive educational setting. Your instructor strives to create a classroom environment built upon the principles of mutual respect and support. Toward this end, all members participating in this course are expected to demonstrate respect for all other members of the class. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison, Dr. Cindy Zeller (czeller@towson.edu).

For further information regarding the diversity and inclusion policies of Towson University, please see Towson University's Commitment to Diversity, the Fisher College of Science and Mathematics Diversity Action Plan, and the Chemistry Department Diversity Action Plan.

C. Students with disabilities:

Students with any sort of disability who may need special consideration must submit the appropriate paperwork to the instructor during the first week of class. This course is in compliance with Towson University policies for students with disabilities. Students with disabilities are encouraged to register with Accessibility & Disability Services (ADS), 7720 York Road, Suite 232, 410-704-2638 (Voice) or 410-704-4423 (TDD). Students who suspect that they have a disability but do not have documentation are encouraged to contact DSS for advice on how to obtain appropriate evaluation. Note that a memo from ADS is needed before any accommodation can be made.

D. Auditing the course:

Students who wish to change their enrollment status to audit this course must notify the instructor before the end of the fourth week of classes (Friday, September 19, 2025). **No audits will be granted after this date**, and students must either remain in the course to receive a final grade or choose to withdraw before the university deadline (Monday, November 3, 2025).

E. Technology Support:

Assignments will be administered online via Blackboard and Smartwork5. Therefore, a computer with stable internet access is required for this course. Should you encounter any issues related to technology, Towson University may be able to help. Please visit the Office of Technology Services website for more information (https://www.towson.edu/technology).

F. Copyright notice:

Your instructor retains the copyright to all original materials distributed in this course (including, but not limited to, hard copies or electronic copies of lecture notes, problem sets, handouts, assignments, exams, and answer keys). Reposting, selling, or otherwise distributing these materials in any fashion at any time is prohibited.

G. Syllabus Subject to Change:

All information, schedules, dates, and policies outlined in this syllabus are subject to change. Any changes will be announced in writing via email, and a revised version of the syllabus will be posted on Blackboard.