The University of Texas at Tyler

PHYSICAL ORGANIC CHEMISTRY
CHEM 5340.001

Fall 2024 Syllabus

INSTRUCTOR CONTACT INFORMATION AND OFFICE HOURS

Sean C. Butler, Ph.D.
Office: RBS 3031
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Best method of contact is email.

Office Hours:
MW 10:00–11:30 am
T 1:30–3:30 pm
(**Also by appointment**)

It is my policy to be available anytime I am at the University. Please stop by anytime you have questions and I will do my best to assist you whenever possible. Masks are expected. At times, office hours may be conducted online, but this will be made known beforehand.

COURSE MEETING TIMES

Day	Time	Location
R	6:00 – 8:45pm	RBS 2015

PREREQUISITES

- CHEM 3344 and CHEM 3354 or instructor approval.

COURSE DESCRIPTION

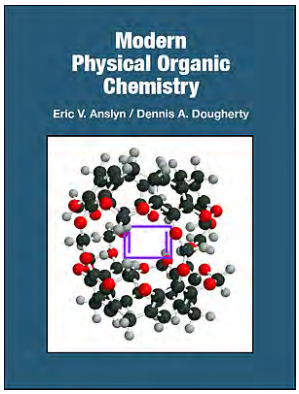
Organic structure and modern models of bonding, strain, and stability; advanced organic acid–base chemistry; advanced stereochemistry; energy surfaces and kinetic analyses; isotope effects; linear free energy relationships; and advanced concepts in electronic structure theory.

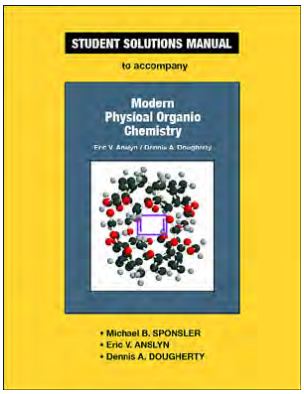
CENSUS DATE AND LAST DAY TO WITHDRAW

Deadline for all registrations, schedule changes, and section changes is, **September 9, 2024** and the last day to withdraw from the course is **November 4, 2024.**

COURSE MATERIALS

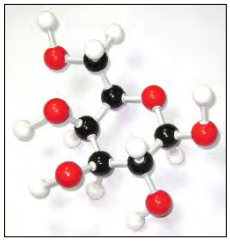
Required: Physical Organic Chemistry by Anslyn and Dougherty (ISBN: 978-1-891389-31-3)
Recommended: Accompanying Solutions Manual (ISBN: 978-1-891389-36-8)





OTHER HELPFUL MATERIALS

Molecular Model Kit



I highly suggest you obtain a model kit for this course. Organic chemistry is very visual; especially conformational analysis and stereochemistry. Model kits are very helpful! Please let me know if you have any questions

STUDENT LEARNING OUTCOMES

By the end of this course, you should:

1. Gain a greater understanding of bonding theories.
2. Explain the reactivity of organic molecules based on conformation, stereochemistry and/or electronic reasons.
3. Be able to better analyze reactions and reaction mechanisms.
4. Read, analyze, and information from the organic literature in a way that other chemists may understand.

COURSE GRADE

Your course grade will be based on the following:

Problem Sets (PROB) – 30%

Three problems sets will be assigned so that you may practice the concepts we cover during in the course. This will mainly consist of open-ended/explanatory/reasoning-type questions where structural drawings are both useful and important. However, problem sets are not limited to just that type of questions.

For each problem set, students will work in assigned groups indicated on the problem set. Only one completed problem set will be turned in per group. It is expected that each person in the group contribute in a meaningful way. These problems sets are not designed for one/two people to complete while the other one/two people take credit for the work. If that is the case, it will negatively reflect the overall score.

Literature Reports (LITR) – 25%

Five articles of relevance to this course will be distributed for you to read and analyze (see course schedule for dates). The first part of your literature report should be a one- to two-page summary of the article and the second part should be a one- to two-page summary (1.5 spacing with appropriately sized font face) of an article pertinent to a recent topic of study in the course related to physical organic chemistry from 2015–2021 (relevant journals include but are not limited to *J. Am. Chem. Soc.; J. Org. Chem.; Org. Lett.; Angew. Chem.; Eur. J. Org. Chem.; Tetrahedron; Tet. Lett.*; etc.). Your description should discuss the problem, the results, and the significance or conclusions. Do not photocopy or copy-and-paste schemes and/or tables from the article into your summary as these should be redrawn/remade by you. Represent the conclusions in your own words. Reports must be typewritten.

Examinations (EXAM) – 45%

Three examinations will be given throughout the semester. Although each exam will focus heavily on the material covered leading up to the exam, previously discussed topics (even those from undergraduate studies) may be needed to adequately reason, understand, and complete an exam.

Note for undergraduate students not in the 4 + 1 Program: **LITR** assignments only require summary of the article provided by the instructor. Each EXAM will be modified from the exam given to graduate students and 4 + 1 Program students.

Grades will tentatively be based on the 90/80/70/60 scale but may be adjusted due to my evaluation of class.

TENTATIVE LIST OF COURSE TOPICS AND IMPORTANT DATES
(Dates and Topics Subject to Change based on Material Covered)

Week	Date	Course Content	Assigned	Due
1	Aug. 26	Chapter 6: Stereochemistry	**LITR1**	
2	Sept. 2	No Class: Labor Day	**PROB1**	
3	Sept. 9	Chapter 2: Strain and Stability		**LITR1**
4	Sept. 16	Chapter 5: Acid/Base Chemistry	**LITR2**	
5	Sept. 23	**EXAM1**		**PROB1**
6	Sept. 30	Chapter 1: Structure and Models of Bonding	**PROB2**	**LITR2**
7	Oct. 7	Chapter 7: Energy Surfaces and Kinetics	**LITR3**	
8	Oct. 14	Chapter 8: Experiments Related to Thermodynamics and Kinetics		
9	Oct. 21	Chapter 9: Catalysis		**LITR3**
10	Oct. 28	**EXAM2**	**LITR4**	**PROB2**
11	Nov. 4	Chapter 10: Organic Reaction Mechanisms	**PROB3**	
12	Nov. 11	Chapter 11: Organic Reaction Mechanisms		**LITR4**
13	Nov. 18	Chapter 14: Advanced Concepts in Electronic Structure Theory (Hückel MO Theory)	**LITR5**	
14	Nov. 25	*No Class – Thanksgiving Break*		
15	Dec. 2	Chapter 15: Thermal Pericyclic Reactions Chapter 16: Photochemistry		**LITR5**
16	Dec. 9	**EXAM3**		**PROB3**

CANVAS LEARNING MANAGEMENT SYSTEM

Canvas will be used extensively this semester. Course notes, handouts, problem sets, literature reports, etc. will be posted for you to use. Additionally, your instructor will be using the Canvas site to post any announcements relevant to this course, so please check the site often.

ARTIFICIAL INTELLIGENCE (AI) STATEMENT

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copy-righted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

AI is not permitted in this course at all. To best support your learning, you must complete all graded assignments by yourself to assist in your learning. This exclusion of other resources to help complete assignments includes artificial intelligence (AI). Refrain from using AI tools to generate any course context (e.g., text, video, audio, images, code, etc.) for an assignment or classroom assignment.

MOBILE DEVICE POLICY

The use of mobile devices is strictly prohibited unless consent is given by the instructor. This includes texting, photography, videography, voice recordings, searching/browsing the internet, listening to music, and things like these. Cell phones, smart watches, and any similar electronic devices must be turned off and put away during exams and/or quizzes. 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; your exam will be taken away, you will receive a zero score (0 points) for the assignment, and you will be referred to the Office of Judicial Affairs.

STUDENT ACADEMIC CONDUCT STATEMENT

Cheating will not be tolerated. The University regulations are very explicit about academic misconduct, and these regulations will be fully enforced. During this course, a code of honor will apply under which students are to perform their own work on assignments and exams and neither give help to other nor receive help from others or from any unauthorized sources. Students also are expected to help enforce this code. The minimum penalty for cheating will be a zero on the assignment in question. **Maximum penalties, up to university expulsion, will be pursued in extreme or repeat cases.**

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.

UNIVERSITY POLICIES

You may follow this link or access the University Policies through Canvas.