

Organic Chemistry I

CHEM 2323 (Sections 02, 03)

Spring 2022

Instructor: Dr. Meagan Hinze (she/her)

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Office Hours: In Person: CFS 325, MWF 2-3 pm

Virtual on Zoom: T/Th 2-3 pm (or by appointment)

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Lecture Location and Time:

2323-Section 02	MWF 11:00-11:50 am	CFS:101
2323-Section 03	MWF 1:00-1:50 pm	CFS: 123

Course GroupMe https://groupme.com/join_group/84196851/aE4NMjTL

Virtual Office Hours (T/Th): Zoom 843-9896-6898 (Passcode: 561196)

Please consider wearing a mask in indoor spaces. As both a courtesy and precaution, Dr. Hinze (who is fully vaccinated and boosted) will be wearing a mask at all times.

Required Materials:

Textbook: Organic Chemistry, Principles and Mechanisms 2nd Ed. by Joel Karty (W.W. Norton & Company, ISBN: 0393630749)

Blackboard: This online course tool will be used for posting and submitting pre-class activities, homework, course announcements, and additional resources.

Recommended (Optional) Materials:

-Study Guide and Solutions Manual by Joel Karty (ISBN: 0393655555)

-Molecular Model Set: Many brands are available and inexpensive. The model may help you visualize 3D structures and *can be used on exams*.

(Please note the Library Service Desk now has several model kits available to borrow.)

-Organic Chemistry As A Second Language (First Semester Topics) by David Klein (any edition) is an additional resource some students have found extremely helpful.

Course Description:

Organic chemistry involves a different approach and mindset compared to introductory and general chemistry. Even if you do not pursue a career that uses concepts from organic chemistry, you will still encounter aspects in your everyday life from medicines, foods, to plastics. This course will provide you with critical thinking and problem-solving strategies that resound across many fields (even outside STEM). A general theme that underlies organic chemistry is understanding the *structure* of molecules and how this impacts *reactivity*.

Attendance Policies:

-Class attendance is expected and highly encouraged.

-If you are absent, you are responsible for acquiring the missed material. (My written out lecture notes are posted on Blackboard by the end of each lecture day.)

-If you are ill the day an assignment is due, please inform me at your earliest convenience so that we may discuss an alternative.

-Accommodations for exams due to illness are possible but need to be requested prior to class and not after the fact.

Teaching Methods:

This class is a discussion about chemistry. Our learning should not be passive, and demonstration of content understanding can be strengthened through explaining to others. This will be done periodically during class or asynchronously through the course GroupMe.

Individual practice is necessary but consider studying together or comparing approaches and answers with others. Avoid peeking at a solution before attempting a problem yourself. Just looking at the answer gives a false sense of security. Stuck? Ask a friend, peer, tutor, or me. Don't just run to the key. You need to be able to recapitulate exercise on your own. Ask questions sooner rather than later. Remember, I am here to be your guide.

This subject can sometimes feel like a foreign language, so spending *time* with the material through doing practice problems, (re)writing notes/study guides, and reading the textbook is essential for material comprehension. Concepts are cumulative, and missing assignments can quickly become overwhelming. Please challenge yourself to stay current with the suggested problems. I do not expect everyone to fall in love with organic but to at least walk away with an appreciation for how organic molecules influence our lives.

Tips for Success:

The following suggestions have been beneficial for previous students.

- Practice problems are essential for applying concepts discussed in lecture or expanding on examples. Breaking up problems into smaller chunks and checking answers regularly (and not after a full chapter is finished) helps prevent errors from being perpetuated.
- Don't go straight to the answer key if you're stuck. Compare tactics with peers for approaching and solving problems. (Consider asking for tips in the GroupMe.)
- Waiting until the weekend before an exam to start practice problems is too late. The earlier you start, the more opportunities you have to ask questions (with me or each other).
- Read the comments on PCAs. If you struggled with a question, break it down and consider the topics being invoked. 'Where have I seen something similar?' Not sure? Ask!
- Make yourself topic summaries, study guides or flashcards, particularly with reactions.
- Context matters. Relying too heavily on YouTube videos or Chegg is not an effective replacement for your instructor (Dr. Hinze). Reach out and ask me questions!

A Few Learning Objectives:

- To identify electrons (pairs) in molecules and their role in structure, resonance, and reactivity.
- To distinguish between acids and bases and predict reaction equilibriums.
- To classify the types of isomerism and the impact on structure.
- To differentiate between types of reactivity (e.g. elimination, substitution, and addition) and fundamental differences in reaction mechanisms and outcomes.
- To develop tools to evaluate reactivity trends and to assess if a process is contrary or in agreement with an established reaction paradigm.
- To recognize the different functional handles on organic molecules, the relationship of the handles to each other, and how their reactivity influences the options on how the pieces could have come together.

Assessments & Grading Policy:

Pre-Class Activity (PCA): This weekly assignment will be available on Blackboard by the

conclusion of class every Wednesday. The activity is due at by 8:00 am on the subsequent Friday. These short activities will review concepts and flex your thinking before lecture and flag problematic concepts or misconceptions. Points are for *participation not accuracy*. One purpose of the PCAs is the chance to just *try* without penalty for mistakes. Stuck and not sure where to begin? Instead of writing 'I don't know', attempt to identify the relevant topics or tools implied by the directions or describe your stumbling point in the process.

Caution: Copying your answers from others or acquiring them through online services (Chegg, etc) will only give you a false sense of mastery. This is *detrimental* to your development in the course, *deprives you of constructive feedback*, and gives me an inaccurate depiction of your progress.

Homework: Curated practice problems formatted as a two-page assignment will be submitted and graded for accuracy. These problems will be distributed one week prior to being due, and feedback will be given within a week of the assignment's submission. Due dates are listed in the course schedule, and deadlines are at the time of class.

Practice Problems: These self-guided questions are located in the textbook. Completion and understanding of practice problems is *critical* for excelling in this course. Suggested problems are found at the end of the syllabus.

Extra Credit: Opportunities for extra credit will only be possible on exams, through an extra credit question related to content, and the 'Organic Chemistry Art Project.' Further submission details and rules for this optional assignment are available on Blackboard.

Exams: Three in-class exams will be given during the semester. Although concepts are cumulative, the focus will be on recently covered material. The final exam is cumulative with a breakdown anticipated to be approximately 3/4 old exam content coverage and 1/4 newer content (since exam 3). All exams will count toward your final grade, and individual exams will *not* have any 'curve' implemented (letter grade cutoff adjustment).

Exams

2/9, 3/9, 4/13

Final Exam

Section 02, M 5/9 10:15 am-12:15 pm

Section 03, T 5/10 12:45 pm-2:45 pm

Overall Distribution of Course Points (550 points total):

Pre-Class Activities (14):	70 points	13% of grade
Homeworks (4):	60 points	11% of grade
Exams (3):	300 points	54% of grade
Final Exam:	120 points	22% of grade

-Grades will be determined based on the total points (pts) possible.

A ≥ 85% (468 pts), B ≥ 75% (413 pts), C ≥ 65% (358 pts), D ≥ 55% (303 pts), F ≤ 55%

-Prof. Hinze reserves the right to lower the cut-off for the letter grades at the end of the semester, but the letter grade thresholds will never be raised from those stated above.

-The policies, assignments, and schedule in the course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.

Late work policy:

Homework: Will not be accepted after two calendar days from the original due date have passed. For each day overdue, 10% of the total points will automatically deducted each day. (e.g. A homework worth 15 points was submitted two days late. A score of 12 would have been awarded if submitted on time, but 1.5 points were deducted for each late day, thus the final score was 9 points.)

PCAs: In order to receive full participation points, a PCA must be submitted by the start of class time. If the PCA is submitted after the start of class but prior to the key being posted (5 pm), only 3 points will be awarded for participation. A PCA will not be accepted for credit after the key is posted at 5 pm, though Dr. Hinze may still provide feedback.

Office Hours:

Office hours provide an opportunity for you to ask me any questions you may have regarding the content of lectures or assignments, grading, or studying tactics. I am here to help facilitate your learning of organic chemistry by providing tools and coaching toward your success. If you would like to talk but cannot attend a designated office hour, feel free to correspond by email, GroupMe, or request to schedule an individual meeting.

Academic Success Center-Supplemental Instruction (SI):

SI study sections are offered for CHEM 2323. SI is free, voluntary, and open to *all* students in the class. Consider using this learning resource.

Academic Integrity:

All assignments and evaluations are assumed to be your own ideas or an interpretation of information available to you that has been properly referenced or cited. Plagiarism and blatant copying of the work of others will not be tolerated. If you have concerns regarding this policy, please schedule a one-on-one meeting with me. For official University policy, see <http://www.shsu.edu/syllabus/>

Instructor Materials:

The lecture notes and supplementary materials (PCAs, HWs, and handouts) provided are property of Prof. Hinze and under her copyright. They are *not* to be posted online or distributed to third-parties without her permission. *Posting any assignment on Chegg (or other tutoring websites) violates Dr. Hinze's copyright for creating course content.* Additionally, no one is allowed to profit monetarily from the circulation of Dr. Hinze's lecture notes or supplemental materials.

Accommodations:

If any assignments or exams conflict with religious holidays or a personal/family

emergency arises, please inform me *by email* (not GroupMe) so that an alternative can be arranged. If an accommodation is needed for a disability, please let me know at your earliest convenience. Aspects of the course may be modified to facilitate your participation and progress. Once aware of your needs, we can work with the Services for Students with Disabilities office to determine appropriate academic accommodations. Any information provided is private and confidential and will be treated as such.

Mental Health and Stress Management:

Academic performance can be adversely impacted by stress, insufficient sleep, relationship complications, anxiety, substance abuse, depression, and other factors. Campus resources are available to provide support and guidance with these matters. Please visit <https://www.shsu.edu/dept/counseling/> for assistance or if you are concerned about another individual.

Course Schedule			<i>Tentative and Subject to Change</i>	
Date	Lecture	Chapter	Topic	Due
W 1/12	1	1	Formula, structure, conventions	
F 1/14	2	1	Lewis structures, formal charge	PCA 1
M 1/17	-		MLK Day (No Class)	
W 1/19	3	1	Condensed formulas, line notation	
F 1/21	4	1	Curved arrow formalism, resonance	PCA 2
M 1/24	5	1, Int. A,B	Resonance, nomenclature <i>Homework 1 released</i>	
W 1/26	6	2,3	Chemical structures and VSEPR/MO	
F 1/28	7	2,3	VSEPR/MO and 3D drawing	PCA 3
M 1/31	8	2,3	Hybridization trends, net dipoles	HW 1
W 2/2	9	2,3	Electronegativity, physical properties	
F 2/4	10	6	Acid/base chemistry <i>Exam 1 material cut-off</i>	PCA 4
M 2/7	11	6	Predicting acid/base reactions	
W 2/9	-	-	Exam 1	
F 2/11	12	6	Structure and pKa trends	PCA 5
M 2/14	13	6	Acid/base strength and stability	
W 2/16	14	4	Isomerization, structure, unsaturation	
F 2/18	15	4	Conformational analysis, Newman projections	PCA 6
M 2/21	16	4	Chair conformers <i>Homework 2 released</i>	
W 2/23	17	5, Int. C	Configurational isomers, stereoisomers	
F 2/25	18	5, Int. C	Chirality, stereocenters	PCA 7
M 2/28	19	5, Int. C	Fischer projections, chiral properties	HW 2
W 3/2	20	16	NMR spectroscopy, chemical shift	
F 3/4	21	16	NMR, integration and coupling <i>Exam 2 material cut-off</i>	PCA 8
M 3/7	22	16	C-13, mass spectroscopy (MS)	
W 3/9	-	-	Exam 2	

F 3/11	23	16	Structure elucidation	PCA 9
M 3/14- F 3/18	-	-	Spring Break (No Class)	
M 3/21	24	7	Reaction classifications, curved arrows	
W 3/23	25	7,8	Reaction analysis, energy diagrams	
F 3/25	26	7, 8	SN/E general considerations	PCA 10
M 3/28	27	8, 9	SN/E mechanism considerations <i>Homework 3 released</i>	
W 3/30	28	9	Building a predictive model	
F 4/1	29	9	Applying a predictive model, reactions	PCA 11
M 4/4	30	9	Regioselectivity, product considerations	HW 3
W 4/6	31	10	Functional group strategy, retrosynthesis	
F 4/8	32	10	Epoxides, Keto-enol tautomerization	PCA 12
			<i>Exam 3 material cut-off</i>	
M 4/11	33	10	Carbonyl α -C reactivity	
W 4/13	-	-	Exam 3	
F 4/15	-	-	Good Friday (No Class)	
M 4/18	34	10	Alkynes, amines, cataloging reactions <i>Homework 4 released</i>	
W 4/20	35	11	Pi-bond chemistry, electrophilic addition (EA) of strong acids	
F 4/22	36	11	EA of weak acids	PCA 13
M 4/25	37	11	EA: stereochemistry and conjugation	HW 4
W 4/27	38	12	EA and cyclic intermediates	
F 4/29	39	12	Epoxidation, non-acidic hydration	PCA 14
M 5/2	40	12	Alkynes revisited, carbenes	Extra Credit Art (<i>optional</i>)
W 5/4	41	-	Reactivity and synthesis overview	
M 5/9	-	-	Final Exam Section 02	10:15 am - 12:15 pm
T 5/10	-	-	Final Exam Section 03	12:45 pm - 2:45 pm

Suggested Problems:

These provide opportunities to practice applying concepts and solving problems. They are curated from the problems highlighted in blue during the chapter or at the end of chapters and not the "Your Turn" problems. The number of problems needed for content mastery will vary by student. In general, suggested problems will either work toward building a foundational level of understanding or require problem solving or combinatorial application.

At minimum you should be completing the in-chapter problems. The end of chapter problems will supplement your practice. Some suggested problems have multiple parts to encourage repetition. If you think you don't need as much practice for that type of problem, skip the extra sections or save them for later. However, repetition and proficiency generally correlate. Problems that are deemed as challenging because they stretch our thinking further have been labeled and are representative of a deeper level of understanding.

Assignments written by Dr. Hinze (PCAs/HWs) demonstrate how she formats problems or asks questions, but the book problems are essential for concept practice and application.

Ch. 1: 2, 4, 8, 9, 11, 12, 15, 17, 19, 21-24, 26, 27, 29, 34, 39, 40, 42-46, 50-55, 57-63, 66, 69, 75, 79, 80 (Challenge: 81, 82)

Int. A: 1, 2, 4, 6-8, 10, 12, 15-17, 20, 25, 26 a-c, 30, 32, 35, 38, 41, 46

Int. B: 1, 2, 4, 5, 7-9, 11-14, 26, 31, 33, 38, 39, 43

Ch. 2: 2-5, 8-11, 14, 17, 19, 20, 24, 26, 27, 32-34, 36, 38, 41, 43, 46, 49, 51, 53, 54
(Challenge: 66, 67, 71)

Ch. 3: 8, 10, 11, 13, 16-21, 27, 34, 36-39, 51, 54, 56

Ch. 6: 2, 3, 5, 6, 8, 11, 14, 19, 21, 22, 26-33, 38, 39, 41, 42, 44, 47a, 48a, 50-52, 54-56, 61, 63, 64, 66-68, 76, 78 (Challenge: 12, 17, 60, 65, 77)

Ch. 4: 2-5, 10, 12-14, 16, 17, 19, 22, 26-31, 34, 40-44, 46, 47, 49 a-c, 50, 54, 63, 65
(Challenge: 39, 60a, 69, 70, 73)

Ch. 5: 1, 3-5, 7-13, 17, 18, 20-23, 26, 28, 36-39, 42, 43, 48-50, 51c, 52b, 57, 59, 71-73, 75
(Challenge: 40, 41, 47, 51 abd, 52 ac, 74, 76)

Int. C: 1-4, 6, 9-12, 14, 18-21, 23, 24, 27

Ch. 16: 4, 6, 8, 9, 13, 14, 16-18, 20, 23, 28-32, 39, 51, 55, 58, 63, 68-70, 78, 79
(Challenge: 40, 86, 87 structure only)

Ch. 7: 2, 4, 6, 9, 11, 12, 15, 16, 18, 20, 22, 24-25, 29, 36, 46-48, 50, 51
(Challenge: 13, 14, 17, 31, 32, 38)

Int. E: 1-6, 10, 12, 14, 26-28, 36, 37, 40-42

Ch. 8: 1-5, 7, 11, 15, 17, 19-22, 24, 27, 29-35, 37-44, 47, 52, 55, 56, 58, 61, 69
(Challenge: 45, 46, 48, 60, 66, 67, 70, 75)

Ch. 9: 1, 6, 14, 18, 21, 33, 35, 37, 39-41, 46, 49, 52, 54, 55, 61, 64, 66-69, 79-81, 83, 84
(Challenge: 56, 73)

Ch. 10: 1-3, 5, 7, 8, 10, 12, 13, 16-18, 21, 22, 24, 26, 30, 35-37, 41, 53, 57, 67, 74
(Challenge: 40, 49, 72)

Ch. 11: 1, 2, 4, 5, 7-9, 11-15, 17, 18, 20, 22-24, 28-30, 37, 40, 44, 53, 57, 59-61
(Challenge: 54, 55)

Ch. 12: 1-4, 6-8, 10-14, 16-18, 20, 21, 24-27, 33, 35, 36, 40, 42, 44, 45, 47, 51-53, 61, 64
(Challenge: 38, 39, 41, 46, 56, 57, 63)

Int. F: 2, 3, 5, 8, 10, 12, 13, 16, 31, 32