

CHEM 2320 - Organic Chemistry II**Instructor:** Dr. Ryan Stolley;

email: ryan.stolley@utah.edu

Office: HEB 4222

Phone: 801-581-6538

Email preferred, will respond within 24h.**Office Hours:** Digital; XX-XX or by appointment.**Zoom Link:** <https://utah.zoom.us/j/93438787202>**Administrative Assistant:** Dasha Walker, email: daria.walker@utah.edu**Teaching Assistants:****TA Office Hour Schedule:** By appointment**COURSE DETAILS:****Prerequisites:** CHEM 2310 is a prerequisite for CHEM 2320. If you received a C or lower in 2310, please consider retaking CHEM 2310 to improve your background. It is highly recommended that you take 2320 and the lab course CHEM 2325 during the same semester.**Course Type:** This is a **HYBRID** course which will be a combination of asynchronous lecture material, digital discussion/group work, and live digital quizzes. Due to COVID-19 considerations, space limitations, and the ever-evolving situation in-person class work will not occur.**Meeting Times:** Lecture and course materials will be delivered asynchronously by Canvas and will be delivered weekly. Discussions and quizzes will be synchronous via zoom every Tu/Th from 6p-8p. Your attendance is required for discussions, and will be invaluable for your success in this class.**COVID-19 Considerations:** Students must self-report if they test positive for COVID-19 via coronavirus.utah.edu. Please do not come to class if you are experiencing COVID-19 symptoms. Remember to maintain social distancing at all times. Face coverings are required for students and faculty. Based on CDC guidelines, the university requires everyone to wear face coverings in shared public spaces on campus, including our classroom. As a reminder, when I wear a face covering, I am protecting you. When you wear a face covering, you are protecting me and all of your classmates. If you forget your face covering, I will ask you to leave class to retrieve it. If you repeatedly fail to wear a face covering in class, I will refer you to the Dean of Students for a possible violation of the Student Code. Note that some students may qualify for accommodations through the Americans with Disabilities Act (ADA). If you think you meet these criteria and desire an exception to the face covering policy, contact the [Center for Disability and Access \(CDA\)](#). Accommodations should be obtained prior to the first day of class so that I am notified by CDA of any students who are not required to wear a face covering.**Required Text:** "Organic Chemistry" David Klein 3rd edition. Digital or Hard copy. You **DO NOT** need the electronic WileyPLUS.

Highly Recommended: Molecular Model kit - any will do (used kits are considerably cheaper). This may not be needed for everyone, but if you have a hard time visualizing and manipulating 3D structures in your mind, this will be critical for you to succeed.

Somewhat Recommended: "Organic Chemistry as a Second Language" David Klein. I see Klein as an excellent introduction to the important basics (electronegativity, resonance, acid/base chemistry). However, you should expect to see higher-level questions on the exams and therefore using this text *exclusively* is not recommended.

Recommended w/ Caveats: The study guide written to accompany the Klein text. This has all the answers to the problems in the text, which makes it too easy to look at them, and then not learn anything. **Should only be used to check your work.** Please use other students, the TAs or the study guide in the Organic Chemistry Study Room or on reserve in the Marriot library.

Canvas: Canvas: <https://learn-uu.uen.org/> The course will be listed on canvas as: **CHEM 2320-070 Spring 2021**. This general site is maintained by the instructor. Look there to find lecture slides, additional resources, quizzes, syllabus and schedule, updates and announcements from the instructor. Please check in this document or on the website before sending an email inquiry if answer can be readily found elsewhere

Technical requirements:

- Due to the hybrid nature of the course access to a working computer with access to Canvas is **required**.
- For our safety, the group-work and discussion-heavy aspect of this course will be conducted primarily online. Having access to a suitable internet connection, a disturbance-free location, and suitable audio and visual hardware are required.
- **All exams will be via Zoom.** You are **required** to have a working camera in order to take the exam. Please check your connection prior to exam times, last minute errors will result in a zero for the exam. Please contact the instructor at least 48 hours before exam time if issues arise.
- For technical assistance, review the [Canvas Getting Started Guide for Students](#) and/or contact TLT at <https://tlt.utah.edu>

COURSE CONTENT:

Content Overview: Organic chemistry is ostensibly the chemistry of carbon and hydrogen. However, the major outcomes of the course are the details of how chemical reactions occur, the basic building blocks and mechanisms of the chemistry of life and most importantly – problem solving using multiple variables in situations where numerous right answers are possible. The lessons learned here will extend beyond the chemistry - providing better skills of triage, spatial awareness, and understanding how everything is made.

Learning Outcomes: Students will gain an understanding of:

- The hybridization and geometry of atoms and the three-dimensional structure of organic molecules
- The reactivity and stability of an organic molecule based on structure, including conformation and stereochemistry
- An understanding of nucleophiles, electrophiles, electronegativity, and resonance
- The prediction of mechanisms for organic reactions
- How to use their understanding of organic mechanisms to predict the outcome of

- reactions.
- How to design syntheses of organic molecules.
 - How to determine the structure of organic molecules using IR and NMR spectroscopic techniques

Course content. The following topics will be covered in CHEM 2320 (detailed schedule below)

- Structure and Bonding
- Conjugation and Resonance
- Reactions of Conjugated Dienes
- Benzene and aromaticity
- Electrophilic and Nucleophilic Aromatic Substitution
- Reactions of carbonyls at the carbonyl carbon
- Reactions of carbonyls at the α -carbon
- Named carbonyl reactions
- Amines
- Nitriles
- Radicals
- Mass Spectrometry and Infrared Spectroscopy
- Nuclear Magnetic Resonance Spectroscopy

Any excluded sections from these chapters will be announced. Otherwise, you are responsible for *everything*, and you are also responsible for everything mentioned in lecture, whether the book covers that material or not. However, lectures will closely mirror the content of the textbook.

Important Dates: **Final Exam** No Final (Yay!)

Fall 2020 Academic Calendar:

<https://registrar.utah.edu/academic-calendars/fall2020.php>

Modules: Class will be broken into separate modules for each week. These modules will begin with a learning outcomes page with a description week's homework and activity(ies). There will then be a series of lecture videos to be watched that week as shown within the module. You will only get access to the activity to be completed the next discussion AFTER watching the lecture videos.

Tips for using the course:

- Pay attention to the learning outcomes. Those are what is trying to be taught and will be tested on.
- Take notes during lecture. I will provide blank lecture slides.
- Do the homework problems during/right after lecture. This way it'll be fresh and makes for good practice.
- Read the book! It's really helpful.
- Make notes on things that are confusing, see if you can find that in the book, and/or ask a TA or Dr. Stolley
- YOU CANNOT AFFORD TO GET BEHIND. Everything in this class stacks and it is nearly impossible to catch up at the pace of the course.
- Make study groups and work together.
- GET HELP EARLY AND OFTEN! We are happy to help!

Grading:

- 1. End of Chapter Problems:** Beginning the first week of the semester I will assign end-of-chapter (EOC) problems from your textbook (see below for details). These assignments will be due as detailed in the course schedule. Each question must be hand-written, either pen/pencil or tablet, computer generated structures will not be graded. **ALL WORK MUST BE SHOWN.** These will be turned in via canvas as **SINGLE** document. **Every problem must be attempted and you must include the concept(s) EACH problem is trying to convey.** If you are unsure how to complete a problem it is your responsibility to provide an analysis of what you don't understand. These **assignments are all or nothing**, incomplete problems will result in a zero for the assignment. **Late homework will not be accepted.**
- 2. Activities:** Activities are group problem solving sets that will done during discussions. These will be directly related to the course material of the week as described in the schedule. Activities will be released only after watching the lecture material. These will also be required to be turned in, however **you do not need to have all of the work completed**, however these must be done in a group format and the names and work of your partners must match. If you cannot attend class you should still complete the activity and turn it in for half credit. **If your participation is suspect or you are not prepared you will receive a zero for the activity.**
- 3. Quizzes:** There will be eleven (11) quizzes over the course of the semester immediately following the completion of a content section as described in the course schedule. These will be done via Zoom during discussion times. You must have a camera on and in an angle, that can be easily proctored. I will automatically drop your lowest Quiz.
- 4. Extra Credit:** There will occasional opportunities for extra credit. The point totals and number of opportunities will shift throughout the semester.
- 5. Final grades** will be assigned based on the 811 points possible.

Academic Honesty Statement	1 point
Syllabus Quiz	10 points
Homework (15)	150 points
Activities (15)	150 points
<u>Quizzes (10)</u>	<u>500 points</u>
Total	811 points

A = 100% to 95.00%, A- = 90.00% to 94.99%, B+ = 89.99% to 85.00 %, B = 82.00% to 84.99%, B- = 80.00% to 81.99%, C+ = 79.99% to 75.00%, C = 74.99% to 72.00%, C- = 70.00% to 71.99.00%, D = 69.99% to 50.00%, F = <50.00%

I reserve the right to adjust the grade cutoffs depending on the course distribution.

Quiz Policy: These dates and times are within normally scheduled hours for this class and will not be changed. **Do not make commitments that conflict with these dates.** Students who are traveling for **University-approved** reasons (e.g., student athletes, disability, etc.) must make arrangements with Professor Stolley **10 days** before the examination date to arrange for an alternate testing site. **NO MAKEUP QUIZZES** will be given – **NO EXCEPTIONS.** Under special circumstances exams may be taken 1 day early. An unexcused absence from an exam will *result in a score of zero.* You will be able to drop one (1) quiz score at the end of the semester.

NOTE: Exams will NOT be rescheduled because of conflicts with work schedules.

Re-grading: Legitimate questions about the grading of a quiz can be submitted up to 3 days after the exam is handed back. The procedure for turning in an exam for regrading is to attach a regrade application and submission to Dr. Stolley. The entire quiz will be re-graded in all cases.

Academic Misconduct Policy: By submitting an assignment, you are representing that it is your own work and that you have followed the rules associated with the assignment. Incidents of academic misconduct (including cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating on an assignment) will be dealt with severely, in accordance with the Student Code (<https://regulations.utah.edu/academics/6-400.php>) A single instance of academic misconduct may result in a failing grade for the course. Multiple instances of academic misconduct may result in probation, suspension or dismissal from a program, suspension or dismissal from the University, or revocation of a degree or certificate.

Withdrawal Policy: Students may withdraw from the course until the midpoint of the term, but full tuition and fees must be paid. Note that you do not need instructor permission to drop. After the midpoint, withdrawal is allowed only in emergencies and by submitting a petition to the dean of your college. Incompletes are awarded only when a documented emergency prevents the student from taking the final exam, but the student must have taken the three midterm exams and completed 60% of the discussion worksheets.

The Americans with Disabilities Act: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Wellness Statement. This class has a legacy of stressing out students due to the nature of how it will stretch the ways you think, the amount of content, and ways to manage the work needed to succeed. Don't let the stress and anxiety of this class get away from you – speak up soon and get the help academically, socially, mentally, and/or physically. Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Inclusivity Statement: It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. Since we will be involved in a large amount of group work I expect respectful and inclusive interactions between each other. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Discrimination and Harassment: If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or Office of the Dean of Students, 270 Union Building, 801-581-7066. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS). Please see Student Bill of Rights, section E <http://regulations.utah.edu/academics/6-400.php>. I will listen and believe you if someone is

threatening you.

Disclaimer: This syllabus is meant to serve as an outline and guide for our course. Please note that I may modify it with reasonable notice to you. I may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under Announcements.

Study Hints (How to do well in Organic Chemistry!)

- Read the text that is connected to the ongoing topics prior to lectures. Therefore, the level of surprise is much reduced and you can pay attention to the concepts.
- Come to class and take great notes. The lectures are meant to summarize and emphasize important concepts in organic chemistry. For the most part, the lectures are keyed to the text so that you can easily use the text to reiterate points.
- Understand the notes. Do not just memorize. Be able to extract the key points and apply them to the mechanisms and syntheses that our outlined in class or the text. **Recopy notes** and make sure that you get any questions answered that you do not understand.
- Check your notes against the learning objectives.
- Understand concepts. Ask yourself why and try to come up with a solution. Use the text, TAs, classmates, me or other resources to deeply understand the underlying principles. This is an essential aspect of this course.
- ***Work through assigned problems.*** Do not just look at the answers. If you do not feel the questions assigned are adequate, work through the unassigned questions or look at other text books. We will have “harder” questions available every week.
- Use the discussion wisely. Ask questions and do more problems.
- Study in groups. You can learn much from a group atmosphere and explaining a concept to a classmate is one of the best ways to understand the concept yourself.
- Use the teaching assistants' office hours and my office hours.
- Avoid trying to memorize reactions and reagents but rather the FUNDAMENTALS of chemistry to guide you.
- Lastly, be consistent about studying (~30 min/day) to keep up and help organize your thoughts.

Tentative Schedule:

Week	Lecture Material	Due (Monday)	Tuesday	Thursday
Jan 18	Review	PreGame (Friday latest)	Class Overview Discussion Activity 1	Discussion Activity 1
Jan 25	Conjugation, resonance, dienes addition rxns	HW 1 Activity 1	Discussion Activity 2	Discussion Activity 2
Feb 1	- Diels-Alder - Electrocyclizations	HW 2 Activity 2	Discussion Activity 3	Quiz 1 (dienes) Discussion Activity 3
Feb 8	Benzene and Aromaticity	HW 3 Activity 3	Discussion Activity 4	Quiz 2 (DA/EC) Discussion Activity 4
Feb 15	Electrophilic Aromatic Substitution	HW 4 Activity 4	Discussion Activity 5	Quiz 3 (Arom.) Discussion Activity 5
Feb 22	- NAS - Benzylic Rxns	HW 5 Activity 5	Discussion Activity 6	Quiz 4 (EAS) Discussion Activity 6
March 1	- Redox - Synth of Carbonyls	HW 6 Activity 6	Discussion Activity 7	Discussion Activity 7
March 8	Aldehydes/Ketones, w/ O,S,N-Nuc	HW 7 Activity 7	Discussion Activity 8	Discussion Activity 8
March 15	- Carbon Nuc. - Protecting Groups	HW 8 Activity 8	Quiz 6 Discussion Activity 9	Discussion Activity 9
March 22	Carboxylic Acids and Derivatives	HW 9 Activity 9	Discussion Activity 10	Quiz 5 (Ald/Ket) Discussion Activity 10
March 29	Carbonyl α -Substitution, Malonic/Acetylacetonate Synth.	HW 10 Activity 10	Discussion Activity 11	Quiz 6 (Carbox) Discussion Activity 11
April 5	- Aldol, - Claisen, - Dieckmann,	HW 11 Activity 11	Quiz 8 Discussion Activity 12	Quiz 7 (α -Sub) Discussion Activity 12
April 12	- Michael, - Robinson Annulation, - Stork	HW 12 Activity 12	Quiz 9 Discussion Activity 13	Quiz 8 (aldol/Claisen) Discussion Activity 13
April 19	- Amines, - Nitriles	HW 13 Activity 13	Quiz 10 Discussion Activity 14	Quiz 9 (named rxns) Discussion Activity 14
April 26	Radicals	HW 14 Activity 14	Discussion Activity 15	Quiz 10 (amine, nitrile)
May 3	NONE!	HW 15 Activity 15	Quiz 11 (radicals)	NO CLASS