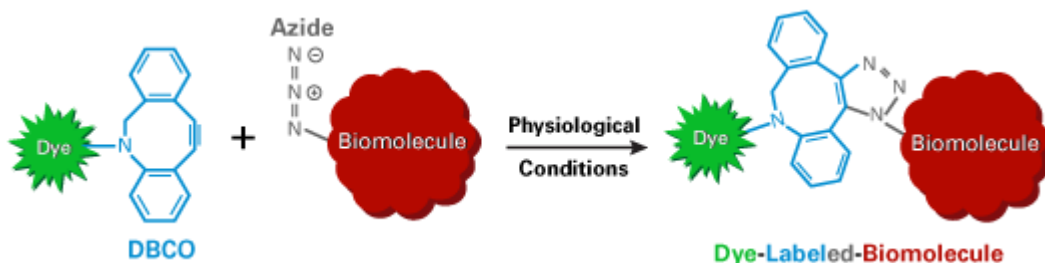


# CHEM432-1001:Organic Chemistry

[Jump to Today](#)

 Edit

## CHEM 432 Organic Chemistry, Spring 2023



Bioorthogonal chemistry. Image from <<https://www.licor.com/>> (<https://www.licor.com/>).

### Course Information

Instructor: Prof. Byron W. Purse (he/him/his)

[bpurse@sdsu.edu](mailto:bpurse@sdsu.edu) (answers normally within 24 h or following weekends)

Office Location: CSL 213 & Zoom livestream; Zoom will be recorded

Office Hours Times (1 hr each): M at 9:30 AM, W at 9:30 AM, F at 12:00 PM

Office Hours Location: CSL 213 & Zoom livestream at <https://sdsu.zoom.us/j/83934658992>

(<https://sdsu.zoom.us/j/83934658992>) (must be signed in to Zoom with an @sdsu.edu account)

Teaching Assistant: Haley Palm (she/her/hers)

[hpalm@sdsu.edu](mailto:hpalm@sdsu.edu) (<mailto:hpalm@sdsu.edu>)

Lab Coordinator: Zach Brown

[zebrown2@sdsu.edu](mailto:zebrown2@sdsu.edu) (<mailto:zebrown2@sdsu.edu>)

In-Person Class Meetings: MWF

Class Times: 11:00–11:50 AM

Class Location: 060 NE, attendance is recommended, but lectures will also be livestreamed on Zoom

Zoom livestream: <https://sdsu.zoom.us/j/85706892938> (<https://sdsu.zoom.us/j/85706892938>) (must be signed in to Zoom with an @sdsu.edu account)

### Midterm Exams

Midterm exams will begin on **February 10**, **March 10** and **April 14**.

The exams will be administered in Canvas and will be a mixture of styles, including multiple choice, matching, short answer, and uploading images of hand-drawn chemical structures and reaction

mechanisms.

You will have 120 minutes to take each exam. Exams will be available from Fridays at 3:00 PM to Sundays at 3:00 PM. To ensure exam security you must be logged into your personal Zoom room with camera on and recording to cloud. A link to the recording must be uploaded to Canvas under the exam assignment titled "post your zoom for exam# here." **Failure to do this will result in a 0 on that exam.**

All exams are 'open note,' but due to the time constraints, it's normally necessary to be well prepared by careful studying and the creation of organized notes. All together the exams and final are worth **500 points**. **If it helps your grade, your lowest exam score can be replaced with your final exam score** (scaled to a total of 100 points).

**\*\*\*There will be no make-up exams.\*\*\*** If you miss an exam, for \*any reason\*, it will count as the dropped exam.

## Final Exam

The final exam will be in the same format as the midterm exams and run from Friday, May 5 at 3:00 PM to Sunday, May 7 at 3:00 PM. The final exam is **cumulative** and worth 200 points. **The final exam is mandatory and cannot be dropped.**

## Prerequisites

Organic Chemistry 1 (CHEM 232 and the 232 lab at SDSU) with a grade of C or better. If you have already taken and passed the 432 lab, bring proof to the first lecture. If you have taken the first half of a year-long introductory organic chemistry college course elsewhere and want me to evaluate whether you have satisfied the prerequisites, bring written proof of what you have taken and written documentation of what the class and lab entailed.

## Course Information

Updated information is available on the course Canvas site through SDSU.

## Course Catalog Description

**Prerequisites:** Chemistry 232 with a grade of C (2.0) or better and credit or concurrent registration in Chemistry 432L.

Continuation of Chemistry 232. Same course as lecture portion of Chemistry 431. Not open to students with credit in Chemistry 431.

## Scope and Purpose

This course completes a two-semester study of the fundamentals of organic chemistry. The course will focus on how to use molecular structure to predict and understand the properties and chemical reactivity of organic molecules, with examples drawn from industrial process chemistry, medicinal chemistry, and biological chemistry.

Students should meet the following **general learning outcomes** as a minimum requirement in order to pass the course. A detailed list of learning outcomes will be developed and provided chapter-by-chapter, throughout the semester.

- 1) Describe the bonding and hybridization of organic compounds, especially conjugated systems, arenes, carbonyl compounds, carboxylic acids and derivatives, and amines.
- 2) Predict the physical properties of organic compounds based on structure, with a special focus on conjugated systems, arenes, carbonyl compounds, carboxylic acids and derivatives, and amines.
- 3) Use resonance, the properties of conjugated systems, and Hückel's Rule to explain the stability, structure, spectroscopy, and aromaticity of unsaturated organic compounds.
- 4) Use the curved arrow formalism to explain and predict the mechanisms of reactions of conjugated dienes.
- 5) Use the curved arrow formalism to explain and predict the mechanisms of reactions of arenes, including electrophilic aromatic substitutions, Friedel–Crafts chemistry, nucleophilic aromatic substitutions, the chemistry of benzyne, and directing group effects.
- 6) Use the curved arrow formalism to explain and predict the mechanisms of reactions of aldehydes and ketones.
- 7) Use the curved arrow formalism to explain and predict the mechanisms of reactions of carboxylic acids and their derivatives.
- 8) Use the curved arrow formalism to explain and predict the mechanisms of reactions at the  $\alpha$  position of carbonyl compounds, including the chemistry of enols, enolates, enamines, imines, and iminium ions.
- 9) Use the curved arrow formalism to explain and predict the mechanisms of reactions of  $\alpha,\beta$ -unsaturated carbonyl compounds and other conjugated carbonyl systems.
- 10) Use the curved arrow formalism to explain and predict the mechanisms of reactions of amines, acyl amines, and diazonium compounds.
- 11) Use fundamental principles of electron counting and bonding to describe the structure and predict the reactivity of organometallic compounds.
- 12) Use the curved arrow formalism to explain and predict organometallic reaction mechanisms, including hydrogenation, the Heck–Mizoroki reaction, the Suzuki–Miyaura reaction, the Stille coupling, the Sonogashira coupling, and olefin metathesis.

## Course Outline and Assigned Reading from Solomons 13e.

Review: Chapter 3 (esp. fundamentals of rxn mechanisms, acidity/basicity), plus hybridization, bonding, & resonance

Chapter 13: Conjugated Unsaturated Systems; read pp. 585–622

Chapter 14: Aromatic Compounds; read pp. 632–665

Chapter 15: Reactions of Aromatic Compounds; read pp. 675–717

Chapter 12: Alcohols from Carbonyl Compounds; read pp. 545–574

Chapter 16: Aldehydes and Ketones; read pp. 730–747

Chapter 17: Carboxylic Acids and Their Derivatives; read pp. 761–824

Chapter 18: Reactions at the  $\alpha$  Carbon of Carbonyl Compounds; read pp. 834–863

Chapter 19: Condensation and Conjugate Addition Reactions of Carbonyl Compounds; read pp. 873–902

Chapter 20: Amines; read pp. 916–954

Chapter 21: Transition Metal Complexes; read pp. 966–988

if time allows: Intro to bioorthogonal chemistry (2022 Nobel Prize)

## Adding/Dropping Procedures

January 31 is the last day to add/drop classes or change grading basis. To add a class during the schedule adjustment period, students can request an add code from the instructor. Please email the instructor regarding add codes for other circumstances.

## Course Materials

Custom course materials (lecture slides, etc.) will be posted on Canvas. Do not share them in violation of copyright. See below, in orange text.

*Unauthorized recording or dissemination of virtual course instruction or materials by students, especially with the intent to disrupt normal university operations or facilitate academic dishonesty, is a violation of the Student Conduct Code. This includes posting of exam problems, the instructor's lecture slides and other original materials, or questions to online platforms. Violators may be subject to discipline.*

### Textbook

Organic Chemistry, 13e., by Solomons, Fryhle, and Snyder, Wiley Publ. 2022; ISBN: 978-1119768197. Provided by Equitable Access.

### Electronic Homework

WileyPLUS is included with the eTextbook listed above and will be used for homework in this course.

**Equitable Access Course:** Some or all of the required materials for this class are provided in digital format within Canvas. The materials are available by the first day of classes and are free through the add/drop date. The SDSU add/drop deadline is at 7:59 p.m. PDT but you have until 11:59 p.m. PDT to opt out of Immediate Access. Unless you opt out of Immediate Access by 11:59 p.m. PDT on the add/drop date, your SDSU student account will then be charged the special reduced price for use of the materials for the remainder of the semester. For additional information about Equitable Access pricing, digital subscription duration, print add-ons, **opting out** and other frequently asked questions, [click here](#).

[🔗 \(https://www.shopaztecs.com/t-equitableaccess.aspx\)](https://www.shopaztecs.com/t-equitableaccess.aspx)

## Optional Learning Materials

Study Guide and Solutions Manual to Accompany Organic Chemistry, 13e., by Solomons, Fryhle, and Snyder, Wiley Publ. 2022; ISBN-13: 978-1-119-76825-8. Not required, but useful for studying.

Most any other organic chemistry textbook will cover nearly the same material. Have a look at one if you'd like to see these concepts presented in a different way or try to more practice problems.

## Course Structure and Conduct

The course will consist of a series of in-person lectures with discussion and problem solving (will be livestreamed on Zoom), assigned readings, electronic homework, and online, asynchronous exams managed through Canvas. Canvas will be used for all course management and communication.

## Course Assessment and Grading

**Web cam use during virtual, Zoom-recorded exams will be required.**

There will be three **midterm exams** during the semester, each worth 100 points. The schedule is above.

The **final exam** will be cumulative and is worth 200 points.

There will be **no make-up exams**. If you have to miss an exam, then your final exam grade will replace that one missed exam score.

There will be a **chapter homework** assigned for each chapter using WileyPLUS. Altogether, they're worth 60 points.

**Extra credit** will be awarded for meaningful contributions to the class discussion board. You can earn up to 5 points per discussion board (with 4 boards throughout the semester) at a rate of 1 point per contribution, but you are welcome and encouraged to post beyond that. You can earn up to 20 points.


Activity	Points
Midterm 1	100
Midterm 2	100
Midterm 3	100
Final Exam	200
Homework	60
Extra Credit	20
<b>TOTAL</b>	<b>560</b>

**Curving:** Curves may be applied to individual activities (exams, homework, etc.), but the total grade will not be curved.


**Letter Grades** will be assigned according to the following table. Scores will not be rounded.

Letter Grade	Minimum Score / 560
A	504
A-	476
B+	448
B	420
B-	392
C+	364
C	336
C-	308
D+	280
D	252
D-	224
F	0

## Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the [Student Ability Success Center](https://newscenter.sdsu.edu/student_affairs/sds/)  ([https://newscenter.sdsu.edu/student\\_affairs/sds/](https://newscenter.sdsu.edu/student_affairs/sds/)) at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact the Center as soon as possible. Please note that *accommodations are not retroactive*, and that accommodations based upon disability cannot be provided until you are properly registered with the Center.

## Academic Honesty

The University adheres to a strict policy regarding cheating and plagiarism. These activities will not be tolerated in this class. Become familiar with the policy at [https://newscenter.sdsu.edu/student\\_affairs/srr/conduct.aspx](https://newscenter.sdsu.edu/student_affairs/srr/conduct.aspx)  ([https://newscenter.sdsu.edu/student\\_affairs/srr/conduct.aspx](https://newscenter.sdsu.edu/student_affairs/srr/conduct.aspx)). Any cheating or plagiarism will result in failing this class and a disciplinary review by Student Affairs. **Cheating, which includes unauthorized team work and the use of unauthorized resources (Chegg, etc.) or hired/voluntary help during exams, will not be tolerated.** I want you all to be proud of yourselves for working hard, learning lots, and doing a great job at a tough course, not ashamed of yourselves for having cheated in O Chem. I believe that everyone in this class has the ability and talent to do a great job and I'm committed to help you achieve your best, but there's no substitute for hard and honest work.

Examples of Plagiarism include but are not limited to:

- Using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work)
- Copying and pasting work from an online or offline source directly and calling it your own
- Using information you find from an online or offline source without giving the author credit
- Replacing words or phrases from another source and inserting your own words or phrases
- Submitting a piece of work you did for one class to another class

## Labs

The lab coordinator for this class is Zach Brown ([zebrown2@sdsu.edu](mailto:zebrown2@sdsu.edu) (<mailto:zebrown2@sdsu.edu>)).

Labs will also be in person. Labs will begin the week of January 23.

## Extra Help

Help is available in a variety of forms.

- Online discussions on this Canvas site
- Office hours
- Discussions with your TA and your TA's office hours
- Tutors (the Chemistry Office will publish a tutor list; check back here)

You are always welcome to join my office hours for help in a fun and positive group setting, but please make a strong effort to solve problems on your own or work with study groups because doing so will enhance your learning experience.

## Tips for Success

**Do not fall behind.** We will start with reviewing the fundamentals and build on them so that you can develop a deep understanding of how the structure of organic molecules determines their properties. Consequently, material later in the course will be much more difficult if you haven't mastered the material that comes first, and we will never move on to a point where you will not need the earlier material.






In my opinion, the most important skill for success is your ability to self-assess. Don't plan to study for a fixed number of hours. Plan to study for as long as it takes until you are confident that you've mastered the material. Develop a plan to check the completeness of your understanding by problem solving exercises and discussion with your peers. You should be confident of your skills when heading into an exam. Obviously, this is much harder to achieve if you don't start preparing until the day before an exam.

You can't be a proficient scientist without a basis of factual knowledge, meaning that some memorization is an essential part of your education. That said, exams will be designed as much as possible to test your comprehension rather than focusing on rote memorization. For that reason, exam questions will

use concepts that you've learned, but won't be identical those questions found on old exams and as practice problems.

This is an upper division organic chemistry class and you should expect to study hard to earn a great grade!

## Course Summary:

Date	Details	Due
Fri Feb 3, 2023	 <a href="https://sdsu.instructure.com/courses/126948/assignments/896400">Chapter 13 Homework</a> ( <a href="https://sdsu.instructure.com/courses/126948/assignments/896400">https://sdsu.instructure.com/courses/126948/assignments/896400</a> )	due by 11:59pm
Wed Feb 8, 2023	 <a href="https://sdsu.instructure.com/courses/126948/assignments/901217">Chapter 14 Homework</a> ( <a href="https://sdsu.instructure.com/courses/126948/assignments/901217">https://sdsu.instructure.com/courses/126948/assignments/901217</a> )	due by 11:59pm
Fri Feb 10, 2023	 <a href="https://sdsu.instructure.com/courses/126948/assignments/902069">Chapter 15 (Part 1) Homework</a> ( <a href="https://sdsu.instructure.com/courses/126948/assignments/902069">https://sdsu.instructure.com/courses/126948/assignments/902069</a> )	due by 3pm
Sun Feb 12, 2023	 <a href="https://sdsu.instructure.com/courses/126948/assignments/903648">Midterm Exam 1</a> ( <a href="https://sdsu.instructure.com/courses/126948/assignments/903648">https://sdsu.instructure.com/courses/126948/assignments/903648</a> )	due by 3pm
	 <a href="https://sdsu.instructure.com/courses/126948/assignments/901735">Upload Zoom Recording for Exam 1</a> ( <a href="https://sdsu.instructure.com/courses/126948/assignments/901735">https://sdsu.instructure.com/courses/126948/assignments/901735</a> )	