

LECTURE SYLLABUS

Course Organic Chemistry II, 32: Lecture and Laboratory
Time and Location Monday through Friday– 1:00-4:00 p.m., Daly Science 207

Lecture Text

The text for the lecture component of this course is optional. The following texts/resources may be useful for you in this course:

1. Virtual Text in Organic Chemistry: <http://www.cem.msu.edu/~reusch/VirtualText/intro1.htm>
2. Any reasonable organic chemistry text, electronic or print form, for lecture preparation by reading about topics to be covered in the subsequent lecture. McMurry (any edition) or texts by Loudon, Ege, Solomons and Wade are also good.

Course Materials

All course materials are posted on our class webpage: <https://sites.google.com/a/scu.edu/chemistry-31---organic-chemistry-i/> and a shared Google folder. You will need to obtain a copy of the two large packets, the Class Packet and the Problems Packet. Both are large documents, which can be printed from our Chem 32 pages or purchased from Copy Craft for about \$15 each (<http://copycraft-ca.com>, 341 Lafayette St, Santa Clara). We will refer to the Class Packet in lecture regularly, so you are expected to bring the Class Packet to every lecture.

Laboratory Text and Materials

Required Text: *Laboratory Techniques in Organic Chemistry* by Mohrig, Alberg, Hofmeister, Schatz and Hammond, 4th Edition. You will use this text in Chem 31-33. Other materials for laboratory can be found on Chem 32 Laboratory webpage (<https://sites.google.com/a/scu.edu/organic-chemistry-laboratory/>). You also must bring your safety splash goggles, lab coat and lab notebook to laboratory every day, including the first day your lab section meets.

Laboratory Notebook: You are required to use a notebook that we ordered especially for Chem 31-33, which can be purchased from the Campus Bookstore. The laboratory notebook is black with numbered, quad ruled pages, embossed with "Santa Clara University" from the Scientific Notebook Company. Do not purchase other notebooks that could be on sale in the bookstore. **You may use the same notebook as you purchased for Chem 31L.**

Supplements

Molecular model set: This is optional but helpful for visualizing molecules in 3D. and you can purchase from the bookstore. We sell the Darling Model Kits (<http://www.darlingmodels.com/>) but any model kit will suffice.

Instructors

Lecture: Dr. Brian J. McNelis; Email: bmcnelis@scu.edu; Phone: 554-4797
Laboratory: Drs. Ruhland and Gipson

Office Hours Alumni Science 160 M-Th, 4-5 pm; Other times by appointment

Course Objectives

This course will expand your understanding of fundamental principles in organic chemistry and their application to solving chemical problems. Additionally, you will apply the concepts from lecture in the laboratory setting. To do so, this course will meet the following objectives:

1. Communicating chemical information effectively. You will learn both the technical vocabulary used and the clear representation of chemical structures and reaction mechanisms.
2. Relating physical and structural properties of organic molecules with their reactivities. You will learn to identify and compare the molecular features that govern chemical reactivity.
3. Predicting the outcomes of chemical reactions. You will learn to think critically in applying central principles of organic chemistry to solve chemical problems in a rational manner.

4. Applying chemical principles in the laboratory. You will learn to execute independent experiments that supplement and complement the topics covered in lecture. You will become proficient in essential techniques for the reaction, isolation, and purification of organic compounds, and the proper disposal of waste produced in generating them. You will also learn the proper use and maintenance of a laboratory notebook as a record of your experimental work.

Course Content and Approach

In this second term of the three-course sequence, we will examine a number of spectroscopic methods as a means of identifying organic compounds. A review of infrared spectroscopy followed by a discussion of nuclear magnetic resonance and mass spectrometry will provide us the essential tools for structure determination. A return to our discussions of reactions and mechanism will feature a number of different functional groups and their chemistry. Specifically, alcohols, aldehydes, ketones and carboxylic acids will be investigated. Carboxylic acid derivatives and acyl substitution reactions will also be studied in detail as many of these reactions proceed through the same general mechanism. We will continue the study of nucleophile-electrophile processes by learning about an important carbanion nucleophile, the enolate. As in the previous course, the main objective will be the use of mechanism as a tool in problem solving and to understand organic reactivity and new chemical processes. In addition, spectroscopy will add another challenge in problem solving as we learn to predict structure using the different spectroscopic methods. We will continue to use of email and the Google sites to support the problem solving objectives of this course.

Grades

Grades will be based on your performance on 2 exams (100 points) and the final exam (200 points). Your grade in laboratory will have a small but possibly significant impact on your overall final grade, possibly to increase or decrease your overall course grade. Unsuccessful completion of the laboratory work is grounds for failure in the course. Final grades will be based on a curve, which reflects your performance relative to the average for the class.

Academic Integrity

You are expected to maintain the highest standards of academic integrity in both the lecture and laboratory components of this course. Giving or receiving unauthorized aid in any form will result in course failure. Please see me if you need clarification on what constitutes unauthorized aid in your lecture or laboratory work. In the lecture, you will be asked to sign an academic integrity pledge on all quizzes and exams. The pledge reads: "I am committed to being a person of integrity. I pledge, as a member of the Santa Clara University community, to abide by and uphold the standards of academic integrity contained in the Student Conduct Code."

Standards

This course is a prerequisite for Chemistry 33, Organic Chemistry III. A grade of C- or higher in Chem 32 is strongly recommended before taking Chem 33. **Students who receive grades lower than C- are urged to meet with their instructor before considering continuing on to Chemistry 32 or 33.**

Pathways

Chemistry 32 is associated with the Pathway in "Paradigm Shifts & The Nature of Human Knowing", and it may be associate with other pathways in the future. If you declare a Pathway in these areas, you may use a representative piece of work from this course in the Pathway Portfolio you will complete during your senior year. It is recommended that you keep copies of your work.

Policy on Electronic Devices

Use of cell phones, laptop computers, or other electronic devices during class time is prohibited. An exception to this policy is the use of a tablet and stylus to take notes and draw pictures. This can be very effective, especially since you can draw directly on the Class and Problem Packet pdf documents. A laptop is not an effective note-taking device in organic chemistry, so if you are using a laptop in this class, it is assumed you are doing other work. Looking at the Class or Problems Packets electronically is not effective; these materials require annotation so a paper copy (or a tablet/iPad) must be used in lecture. ANY use of cell phones or other electronics (including calculators) during exams will be considered a breach of academic integrity.

Disability Accomodation Policy

To request academic accommodations for a disability, students must contact Disabilities Resources located on the second floor of Benson. Phone numbers are (408) 554-4111; TTY (408)554-5445. Students must register and provide documentation of a disability to Disabilities Resources prior to receiving academic accommodations.

Discrimination and Sexual Misconduct (Title IX)

Santa Clara University upholds a zero-tolerance policy for discrimination, harassment and sexual misconduct. If you (or someone you know) have experienced discrimination or harassment, including sexual assault, domestic/dating violence, or stalking, I encourage you to tell someone promptly. For more information, please consult the University's Gender-Based Discrimination and Sexual Misconduct Policy at <http://bit.ly/2ce1hBb> or contact the University's EEO and Title IX Coordinator, Belinda Guthrie, at [408-554-3043](tel:408-554-3043), bguthrie@scu.edu. Reports may be submitted online through <https://www.scu.edu/osl/report/> or anonymously through Ethicspoint <https://www.scu.edu/hr/quick-links/ethicspoint/>

CLASS SCHEDULE

<u>DAY</u>	<u>DATE</u>	<u>TOPIC</u>
M	July 10	Infrared Spectroscopy-Review and Advanced Topics, Intro to Nuclear Magnetic Resonance Spectroscopy
T	July 11	NMR Spectroscopy, Mass Spectrometry
W	July 12	Structure Determination using IR, NMR and MS: Alcohols, Diols and Ethers
Th	July 13	Alcohols, Diols and Ethers
F	July 14	EXAM 1 , Aldehydes and Ketones
M	July 17	Aldehydes and Ketones
T	July 18	Aldehydes and Ketones
W	July 19	Carboxylic Acids and Derivatives-Acyl Substitution Rxns
Th	July 20	Carboxylic Acids and Derivatives-Acyl Substitution Rxns
F	July 21	EXAM 2 , Carboxylic Acids and Derivatives-Acyl Substitution Rxns
M	July 24	Carboxylic Acids and Derivatives-Acyl Substitution Rxns
T	July 25	Structural Effects in Acidity – Formation of Enols and Enolates; Kinetic vs. Thermodynamic Bases
W	July 26	Enols & Enolates as Nucleophiles-Alkylation and Related Reactions
Th	July 27	Review and Problems
F	July 28	FINAL EXAM 1-4 pm

Note: The Final Exam will only be given at the designated time.