

**Chem 232, Organic Chemistry  
Fall 2019 (Schedule #208XX)**

**Instructor:** Dr. B. Mikael Bergdahl (bbergdahl@sdsu.edu)  
Office: **GMCS 213G (or CSL 204)**  
Phone: (619) 594-5865 (office)

**Lecture meetings:** MWF: 10:00-10:50, **GMCS 333**

**Office Hours:** TTh: 9:00 - 10:00 and by appointment

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**Texts:** (a) Solomons & Fryhle & Snyder, *Organic Chemistry*, 12<sup>th</sup> Ed., Wiley Publ. 2016  
ISBN: 978-1-118-87576-6.

(b) Solomons, Fryhle, Snyder, *Student Guide and Solutions Manual Organic Chemistry* 12<sup>th</sup> Ed.  
ISBN: 978-1-119-07732-9.

(c) 4x5 inch note cards (from the book store)

**Lab:** (a) R. Somanathan *et al.*, *Chem 232 Lab Supplemental Material*. Fall 2019.

(b) Pavia *et al.* *Laboratory text*. Available in the laboratory.

**Tool:** A set of molecular models, such as Prentice-Hall Molecular models, is optional but strongly recommended.

**Web:** <http://chemistry.sdsu.edu/courses/CHEM232/>

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**Expected Student Learning Outcomes** (Chemistry 232 objectives):

a) To be able to describe physical properties of organic substances and fundamental chemical reactions in organic chemistry.

b) To be able to determine bonds and hybridizations, Lewis structures, dynamics and stereochemistry of simple organic molecules.

c) To be able to depict chemical mechanisms for rudimentary organic reactions using the curved arrow formalism.

d) To be able to determine and differentiate various types of simple organic reactions: S<sub>N</sub>1, S<sub>N</sub>2, E1 and E2 pathways.

e) To be able to describe the relationship between different functional groups and organic chemical reactions.

f) To be able to explain the connection and similarity between organic chemistry and the application on common "daily life" biochemical processes.

g) To be able to apply and use the outcomes above and apply those in upper division organic chemistry (Chem 432), biochemistry, and more advanced organic chemistry and synthesis.

**Prerequisite:** A grade of "C" or better from Chem 201 or corresponding chemistry course.

**Adding Procedures:** Schedule numbers will be provided the first week of class. Students can enroll or will be added from the waitlist only if space is available the first week of class. **Students are not allowed to enroll Chem 232 lecture only, unless they have already completed Chem 232L.**

**Dropping Procedure:** None

**Course Structure and Conduct:** The lecture course consists of three (MWF) 50 min face-to-face lectures per week. Lectures will be focused on the theoretical basis and understanding of important concepts of organic chemistry. You will not be penalized for not attending lectures directly, but please be aware that there is a *correlation between attendance and lower course grades in organic chemistry*.

**Student disabilities:** If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Ability Success Center at [\(619\) 594-6473](tel:6195946473). 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 I cannot provide accommodations based upon disability until I have received an accommodation letter from the Student Services. Your cooperation is appreciated.

**Course Assessment and Grading:** Three midterm exams will be given on Saturdays (**Sept. 21, Oct. 19 and Nov. 16**) from 10:00am – Noon. *Make sure you can take the exams on these dates before you enroll this class!!* The final exam (“Group Final”) will be given on **Saturday, Dec. 14<sup>th</sup>** from 09:30 – 11:30am. No make up exams will be given. Excused absences, substantiated by an appropriate written and signed confirmation, will result in no penalty. Unexcused absences will result in a “zero” and will account for an “F” grade for such exam. Your TA along with the instructor will grade your midterms and final exam. ***Your course grade will be assigned at the end of the semester and will be based on a curve using a +/- assignment.*** (Letter grades will be assigned for each individual exam – the +/- assignment will not be used for specific exams. There are no pre-determined guidelines for the grade distribution. Most students earn a C, but in fact, it is not too difficult to earn a higher grade in organic chemistry. The cut-off for specific grades varies, but in general an “A” accounts for >85%, a “B” >70% and a “C” around 50%. Exam Scores will be posted on Black Board.

**Course website:** <http://www.chemistry.sdsu.edu/courses/CHEM232/>

**In class Group Activities for Learning:** A number of learning activities will be conducted during the semester. These activities will be based from lectures and on videos uploaded on Youtube created specifically for the course using LearningGlass, and the web-Links to the videos will be provided during lecture, but could also be found at website link above. The answers provided by students using a (4x5 inch) card system for turning in answers.

**Grading:** Your course grade will be based on 550 points maximum.

Summary:	Midterm 1	100	points
	Midterm 2	100	
	Midterm 3	100	
	Problem engagement	100	(max 5 points per activity)
	<u>Final Exam</u>	<u>200</u>	
	Total	600	points

**Supplemental Instruction:** Supplemental Instruction (SI) Sessions will be offered daily for this course, throughout the semester. SI is free and open to all students enrolled in this course. Participation is completely voluntary and near-peer-led, and the instructor will not know who participates. SI Sessions are facilitated by an SI Leader who has recently successfully completed the course, and has been trained to lead active-learning-based group sessions where students can improve their understanding of course material, review and discuss important concepts, develop study strategies, and prepare for exams. Students who participate in SI Sessions typically earn higher final course and exam grades than students who do not participate, sometimes by a half to a full letter grade.

SI Program: [bit.ly/SIatSDSU](http://bit.ly/SIatSDSU)

Meet the SI Leaders: [its.sdsu.edu/chem-232-organic-chemistry/](http://its.sdsu.edu/chem-232-organic-chemistry/)

Session Calendar: [bit.ly/chem232sicalendar](http://bit.ly/chem232sicalendar)

**To get the most out of SI, attend early and often during the semester.**

**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 ([http://go.sdsu.edu/student\\_affairs/srr/conduct.aspx](http://go.sdsu.edu/student_affairs/srr/conduct.aspx))

Any cheating or plagiarism will result in failing this class and a disciplinary review by Student Affairs. 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

If you have questions on what is plagiarism, please consult the policy

([http://go.sdsu.edu/student\\_affairs/srr/conduct.aspx](http://go.sdsu.edu/student_affairs/srr/conduct.aspx))

**Chem 232L:** The laboratory component of the grade will be based on the completion of the experiments, the reports, unknowns, products, quizzes and an evaluation of experimental technique. The laboratory grade (chem 232L) is separate from the chem 232 grade.

You must attend your first scheduled lab or your spot may be forfeit!

Chem 232 Lab Crashers (waitlisted students, enrollment will be determined electronically):

- Preference will be given to SDSU enrolled students, "open university" students can be accepted.
- Preference will be given to students taking Lecture and Lab concurrently.
- Students already enrolled in the lab course must show up for the first day of the lab.
- To keep their space in the lab, failure to show-up after 1hr the space will be given to the next waitlisted student in line (determined electronically).

### **To the student and how to succeed in Organic Chemistry (and science in general):**

1. *Develop good study habits:*
  - a. Attend all lectures and labs.
  - b. Take good lecture notes.
  - c. Use your lecture notes as a guide to your reading in the textbook. Write your questions down if there is something you don't understand. Ask your instructor if you don't understand a concept.
  - d. Make flash cards of definitions, concepts, reactions, structures, and nomenclature that are in the textbook that are emphasized by your instructor in lecture. Writing something is equivalent to reading it ten times.
  - e. Do all the homework problems with the aid of the study guide or answer book. The suggested problems (homework) have about the same difficulty as the problems you will be given on the exams.
  - f. One of the alternative ways for understanding of organic chemistry is to find a study partner or to form a study group and work on problems independently, and then review the answers in the group.
  - g. Keep up to date and **don't fall behind**.
  - h. Seek course advice from science professors and students.
  - i. If necessary, see your instructor or department for a tutor.
  - j. Try to see the "big picture"; try to see how the topic of the week fits in with the whole course. If you have a difficulty achieving this, ask your instructor.
  - k. Practice applying what you have learned in class to the world around you.
  - l. Try to foster your own scientific curiosity – wonder why things are and how they happen.
  - m. Put emphasis on understanding concepts rather than memorizing material.
  - n. If you read the text more than 10 minutes without practicing a problem, something is wrong.....this is not how you should study organic chemistry.
2. *Have a positive attitude.*
3. *Realize that science requires more self discipline than many other majors, but actually offers more rewards.*
4. *Be organized.*
5. *Persevere and be determined to succeed.*

Good Luck in Chem 232!!

**Ithaca** (a philosophical view of the journey of Organic Chemistry )

by [Constantine P. Cavafy](#)

(1863 - 1933)

When you set out on your journey to Ithaca,  
pray that the road is long,  
full of adventure, full of knowledge.  
The Lestrygonians and the Cyclops,  
the angry Poseidon -- do not fear them:  
You will never find such as these on your path,  
if your thoughts remain lofty, if a fine  
emotion touches your spirit and your body.  
The Lestrygonians and the Cyclops,  
the fierce Poseidon you will never encounter,  
if you do not carry them within your soul,  
if your soul does not set them up before you.

Pray that the road is long.  
That the summer mornings are many, when,  
with such pleasure, with such joy  
you will enter ports seen for the first time;  
stop at Phoenician markets,  
and purchase fine merchandise,  
mother-of-pearl and coral, amber, and ebony,  
and sensual perfumes of all kinds,  
as many sensual perfumes as you can;  
visit many Egyptian cities,  
to learn and learn from scholars.

Always keep Ithaca on your mind.  
To arrive there is your ultimate goal.  
But do not hurry the voyage at all.  
It is better to let it last for many years;  
and to anchor at the island when you are old,  
rich with all you have gained on the way,  
not expecting that Ithaca will offer you riches.

Ithaca has given you the beautiful voyage.  
Without her you would have never set out on the road.  
She has nothing more to give you.

And if you find her poor, Ithaca has not deceived you.  
Wise as you have become, with so much experience,  
you must already have understood what these Ithacas mean.

**Highly recommended problems (Solomons & Fryhle, *Organic Chemistry*, 12<sup>th</sup> Ed.).**

**Chapter 1, The Basics, Bonding and Molecular Structure:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 47, 50

**Chapter 2, Families of Carbon Compounds:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 46

**Chapter 3, Acids and Bases:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38

**Chapter 4, Nomenclature and Conformations of Alkanes and Cycloalkanes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 23, 24, 25, 26, 27, 28, 29, 33, 36, 37, 38, 39, 41, 43, 44, 45, 46

**Chapter 5, Stereochemistry:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 44, 45, 46, 47, 48

**Chapter 6, Nucleophilic Reactions:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 45, 46, 47

**Chapter 7, Alkenes and Alkynes I:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

**Chapter 8, Alkenes and Alkynes II:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 53, 54, 59, 61

**Chapter 10, Radical Reactions:** 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31, 32, 33

**Chapter 11, Alcohols and Ethers:** 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 52

### Lecture and Exam schedule; Chem 232, Fall 2019

Monday	Tuesday	Wednesday	Thursday	Friday	
<b>26-Aug</b> <i>Introduction</i>	<b>27-Aug</b>	<b>28-Aug</b> <i>Chapter 2 Introduction</i>	<b>29-Aug</b>	<b>30-Aug</b> <i>Ch.2 cont.</i>	
<b>02-Sep</b> <i>Holiday Labor Day</i>	<b>03-Sep</b>	<b>04-Sep</b> <i>Ch.2 cont.</i>	<b>05-Sep</b>	<b>06-Sep</b> <i>Ch.2 cont.</i>	
<b>09-Sep</b> <i>Chapter 3</i>	<b>10-Sep</b>	<b>11-Sep</b> <i>Ch.3 cont.</i>	<b>12-Sep</b>	<b>13-Sep</b> <i>Ch.3 cont.</i>	
<b>16-Sep</b> <i>Ch.3 cont.</i>	<b>17-Sep</b>	<b>18-Sep</b> <i>Chapter 4</i>	<b>19-Sep</b>	<b>20-Sep</b> <i>Ch.4 cont.</i>	<b>21-Sep</b>  <b>Midterm 1</b>
<b>23-Sep</b> <i>Ch.4 cont.</i>	<b>24-Sep</b>	<b>25-Sep</b> <i>Ch.4 cont.</i>	<b>26-Sep</b>	<b>27-Sep</b> <i>Chapter 5</i>	
<b>30-Sep</b> <i>Ch.5 cont.</i>	<b>01-Oct</b>	<b>02-Oct</b> <i>Ch.5 cont.</i>	<b>03-Oct</b>	<b>04-Oct</b> <i>Ch.5 cont.</i>	
<b>07-Oct</b> <i>Chapter 6</i>	<b>08-Oct</b>	<b>09-Oct</b> <i>Ch.6 cont.</i>	<b>10-Oct</b>	<b>11-Oct</b> <i>Ch.6 cont.</i>	
<b>14-Oct</b> <i>Ch.6 cont.</i>	<b>15-Oct</b>	<b>16-Oct</b> <i>Ch.6 cont.</i>	<b>17-Oct</b>	<b>18-Oct</b> <i>Chapter 7</i>	<b>19-Oct</b>  <b>Midterm 2</b>
<b>21-Oct</b> <i>Ch.7 cont.</i>	<b>22-Oct</b>	<b>23-Oct</b> <i>Ch.7 cont.</i>	<b>24-Oct</b>	<b>25-Oct</b> <i>Ch.7 cont.</i>	
<b>28-Oct</b> <i>Chapter 8</i>	<b>29-Oct</b>	<b>30-Oct</b> <i>Ch.8 cont.</i>	<b>31-Oct</b>	<b>01-Nov</b> <i>Ch.8 cont.</i>	
<b>04-Nov</b> <i>Ch.8 cont.</i>	<b>05-Nov</b>	<b>06-Nov</b> <i>Ch.8 cont.</i>	<b>07-Nov</b>	<b>08-Nov</b> <i>Chapter 10</i>	
<b>11-Nov</b> <i>Holiday Veterans Day</i>	<b>12-Nov</b>	<b>13-Nov</b> <i>Ch.10 cont.</i>	<b>14-Nov</b>	<b>15-Nov</b> <i>Ch.10 cont.</i>	<b>16-Nov</b>  <b>Midterm 3</b>
<b>18-Nov</b> <i>Ch.10 cont.</i>	<b>19-Nov</b>	<b>20-Nov</b> <i>Chapter 11</i>	<b>21-Nov</b>	<b>22-Nov</b> <i>Ch.11 cont.</i>	
<b>25-Nov</b> <i>Ch.11 cont.</i>	<b>26-Nov</b>	<b>27-Nov</b> <i>Holiday Thanksgiving</i>	<b>28-Nov</b> <i>Holiday Thanksgiving</i>	<b>29-Nov</b> <i>Holiday Thanksgiving</i>	
<b>02-Dec</b> <i>Ch.11 cont.</i>	<b>03-Dec</b>	<b>04-Dec</b> <i>Ch.11 cont.</i>	<b>05-Dec</b>	<b>06-Dec</b> <i>Review</i>	
<b>09-Dec</b> <i>Review</i>	<b>10-Dec</b>	<b>11-Dec</b> <i>Last Day of Classes</i>	<b>12-Dec</b> <i>Final's Week</i>	<b>13-Dec</b> <i>Begins</i>	<b>14-Dec</b>  <b>Final Exam 09:30-11:30am</b>
<b>16-Dec</b> <i>Final's Week</i>	<b>17-Dec</b> <i>Final's Week</i>	<b>18-Dec</b> <i>Final's Week</i>	<b>19-Dec</b>	<b>20-Dec</b>	

Saturday midterm exams, 10 am-Noon, Sep. 21, Oct. 19, Nov. 16

Chemistry 232 Final: Saturday Dec 14, 09:30-11:30 pm ("Group Final")