

Syllabus for Chemistry 232 (O-Chem) (v 1.0, 22 August)
San Diego State University, Fall 2014

Professor Douglas Grotjahn **Office: CSL 205** **e-mail: dbgrotjahn@mail.sdsu.edu**
Professor Tom Cole **Office: CSL 210A** **e-mail: tcole@mail.sdsu.edu**

CLASS: 10:00 to 10:50 am, MWF in HT-140.

CRASHING, ETC.:

Come to class the first day for full details. If you have taken and passed 232L, bring proof. If you have taken General Chemistry elsewhere and want me to evaluate whether you have satisfied the pre-requisite (see below), bring written proof of what you have taken and written documentation of what the class entailed.

ATTENDANCE:

Unlike some subjects, teaching O-chem does not lend itself well to Powerpoint slides, so if you miss class, you miss material which is neither in the book nor online. We don't take attendance or use it in making a grade, but your performance will probably suffer if you regularly miss class. Come to class!

PRE-REQUISITES (quoting from the General Catalog):

(the lecture) CHEM 232 - Chemistry 201 with a grade of C or better and credit or concurrent registration in Chem 232L. (the lab) CHEM 232L - Chemistry 201 with a grade of C or better and credit or concurrent registration in Chem 232.

OFFICE HOURS: 11:05 to 12:00 MW (in CSL 205 unless otherwise posted, until middle of semester, when they will be held by Prof. Cole in CSL 210A). Additional office hours will be announced.

EXAMS AND QUIZZES:

Quizzes will be assigned about once a week, taken (**with a time limit**) and graded through WileyPlus. **You are responsible for checking WileyPlus** to find out when quizzes (and homework) are due.

Midterms - Saturday mornings at 10:00 to 12:00. You **MUST** be able to attend the exams to take the class. **No make-up exams will be given under any circumstances** – you get to drop one midterm score (see below). If you miss a midterm, your zero score will be automatically dropped. Midterm dates Saturdays September 13, October 4, October 25 and November 22; room to be determined.

Final exam will be on Saturday, Dec. 13 from 10:30 to 12:30. NOTE: Chem 232 final exam schedule is under Group Finals. In 2009, two people mis-read the schedule and missed the final exam – and got zero points! **There will be no make-up final!**

REQUIRED:

1. *Organic Chemistry* 11th Edition by Solomons and Fryhle – with WileyPlus.

Recognizing the costs of textbooks, we have worked with the publisher to provide the cheapest option. We will use WileyPlus for study guide and homework functions. Older editions or used copies of the text without the access code for the 11th edition will not give you access to WileyPlus, which we will use in this course to handle homework assignments.

Logging in to WileyPlus: see one page “Getting Started with *WileyPLUS* and Blackboard”

Information and introduction to getting started in *WileyPLUS*:

<https://www.wileyplus.com/WileyCDA/resources-and-support/students.html>

2. For lab portion of course, see your 232L TA or coordinator Dr. Somanathan. *Chem 232 Lab Supplemental Materials*, by Somanathan, and *Microscale and Macroscale Techniques*, by Pavia et al.

Highly recommended:

3. Three-dimensional molecular models. Seems like every organic professor has them -- there must be a reason! It is incredibly helpful to have a 3-D model to visualize the actual structure and bonding of organic molecules, just as globes or architectural models are used in addition to flat maps or plans to help visualize those three-dimensional objects. Computer versions are useful but still limited compared with real-life "toys." An inexpensive molecular model kit is available from Andrus Educational Supplies (<https://www.andruseeducation.com/>). You can order this online for \$23.50 or purchase it from Aztec Bookstore.

COURSE REQUIREMENTS:

The prerequisite for Chemistry 232 is one year of General Chemistry. You will need to have a good understanding of general chemistry to do well in this class (**especially orbitals, electronic configurations, bonding theory, acidity and electronegativity**). We will go over these but as a matter of review, applying the concepts to organic chemistry.

PURPOSE:

The goal of this class is to give you a thorough understanding of organic chemistry. This course will lay the foundation for future studies in biology, biochemistry and more advanced chemistry courses.

EXPECTED STUDENT LEARNING OUTCOMES FOR CHEM 232:

1. Understand physical properties of organic compounds and fundamental chemical reactions in organic chemistry.
2. Determine bonding, hybridization, Lewis structures, and / or stereochemistry of simple organic molecules.
3. Show chemical mechanisms for basic organic reactions using the curved arrow formalism ("arrow-pushing").
4. Determine and differentiate various types of simple organic reactions, for example S_N1 , S_N2 , E1 and E2 pathways, radical chain reactions, or additions to double bonds.
5. Understand the relationship between different functional groups and organic chemical reactions.
6. Identify examples of organic chemistry in common "daily life" situations or biochemical processes.
7. Be able to apply and use the outcomes above in more advanced courses such as upper division organic chemistry (Chem 432), biochemistry, and more advanced organic chemistry courses.

WHAT? SOMETIMES NO LECTURE?

Required for the course is a source of Bound Optimally Organized Knowledge – that is, a BOOK (electronic or otherwise). It makes little sense to me and we hope to you who are paying your or someone else's hard-earned dollars to be here that we should lecture day after day, simply following a textbook.

So what are we going to do in class? We will lecture about 80-90% of the time. The rest of the time is your chance to ask questions and really, really learn. We will assign reading material along the way, mostly from the textbook but occasionally from other sources (e.g. handouts). Even more importantly, we will also often assign one or two problems for you to think about and do before the next class. Using WileyPlus, you will be given points for solving these problems. Do the assigned reading and the problems before the next class. Then in class or office hours, ask us questions about what you don't understand! The purpose of the class time is to clarify the material in the book and probably **not all topics can be covered in the class periods, but we expect you to cover what is assigned**. This will require you to learn from the book through reading and self study, along with asking those questions.

WILL I LOOK OR FEEL STUPID ASKING A STUPID QUESTION?

One of the greatest fears for most people (adults anyway). Solution? Ask the questions. Don't worry if they're "stupid." If you doubt the validity of this approach, go talk to an elementary-school class sometime and see how eager they are to ask questions. They don't have to look cool. Why should we?

STUDYING THE SUBJECT:

Many people find organic chemistry to be very difficult. But difficult does not mean boring! In the past we've advised people that this class may require a minimum of 15 hours of time outside of class each week (although your mileage may vary). There is a lot of material to be covered and trying to memorize all of it is unnecessary since the point of the course is to develop an understanding of the subject. To understand organic chemistry you

must think about it, read about it, struggle with problems, go down the wrong path (often). But do the reading and assigned problems before the next class and it will make the discussion easier to follow and will help to clarify concepts that you may have found difficult in the reading. Repeat as needed. Let us know how it goes.

HOMEWORK:

Working problems is essential to understanding organic chemistry. Do, and try to understand, as many problems as you can, not just the ones we assign. The exam problems will use the **concepts** covered in the homework problems - a few will be almost identical, but most different enough that you will need to **understand the principles rather than memorize**. The quiz and exam problems will be designed to test your understanding of the reading, homework and lectures. You are expected to keep up with the homework. Organic chemistry *cannot* be learned the night before the exam. Some homework problems will be assigned to go along with the reading assignments.

Quizzes will be assigned and done through WileyPlus, not in class. You are responsible for checking WileyPlus to keep track of when quizzes will be due. Same with homework.

MIDTERM EXAMS AND FINAL:

Midterms are worth 150 points each, the final 250. The lowest score will be dropped for each person. Midterms 1-4 will be given on Saturdays. **The final will be comprehensive**, covering all the topics addressed by the course. If you miss a midterm, that exam will be dropped automatically. No make-up exams will be given under any circumstances.

Exam Schedule:

Midterm 1	10:00 am – noon Saturday, September 13
Midterm 2	10:00 am – noon Saturday, October 4
Midterm 3	10:00 am – noon Saturday, October 25
Midterm 4	10:00 am – noon Saturday, November 22
Final Exam	Saturday Dec. 13, 10:30 am to 12:30 pm

Locations to be arranged and announced. Exam rooms will be assigned by lab sections in the lecture class.

WANT TO HELP WRITE THE MIDTERM?

If you want a chance at writing one of the midterm questions yourself, here is your chance! Up until the end of class the Wednesday before each midterm, we will accept up to two midterm questions written by you, with the solution given. We will look over what we get and may put one or more of the submissions on the midterm the following Saturday.

Our goal is to help you study the material. Asking your own questions is a great way to study!

SUMMARY OF GRADING:

homework (on WileyPlus)	subtotal	200 points*
quizzes (on WileyPlus)	subtotal	100 points*
4 midterm exams (1 lowest score dropped)	3 midterms x 150 points each =	450 points
comprehensive final exam		250 points
total		1000 points*

The course final grade will be based on the final point total.

*Note! Depending on how use of homework and quizzes and WileyPlus goes, the number of points assigned to homework or quizzes may be adjusted up or down, and with it, the point total may be changed. In addition, some additional assignment(s) may be included, also changing the final point total.

We strongly recommend that you check your exams after they are returned. You can submit an exam for a re-grade up to one week from either the return of the exam or the posting of the key, whichever is done last. After one week, we will not accept exams for consideration.

CHEATING:

There is a zero-tolerance policy for cheating in this class. I expect the highest integrity from you, as you expect of me.

STUDENT DISABILITY RESOURCES:

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at [\(619\) 594-6473](tel:6195946473). To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

CHAPTER TOPICS AND PROPOSED COVERAGE OF MIDTERMS (THE LATTER MAY CHANGE):

MT 1 will cover material discussed in Chapters 1, 2, and 3

MT 2 will emphasize material discussed in chapters 4, 5, 6

- 1 – bonding, Lewis structures, octet rule, resonance, orbitals
- 2 – functional groups, intermolecular forces, IR spectroscopy
- 3 – acids and bases, pK_a , free energy changes, mechanisms
- 4 – alkanes
- 5 – stereochemistry and chiral molecules
- 6 – nucleophilic substitution and elimination
- 7 – alkenes and alkynes – properties and synthesis
- 8 – alkenes and alkynes – reactions
- 9 – NMR and mass spectroscopies – how to identify compounds
- 10 – radical reactions
- 11 – alcohols and ethers
- 12 – alcohols from carbonyl compounds

We may get into chapters 13 and 14 (conjugated unsaturated systems and aromatic compounds) if time allows.