

Chemistry 112A Organic Chemistry, Section 1 (Okuda) Fall 2019

Contact Information

Instructor:	Roy K. Okuda, PhD
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Office Hours:	Tues 3:00 to 4:30pm; Wed 10:30am to Noon
Class Days/Time:	Lecture TR 9:00am - 10:15am
Classroom:	Science 142
Prerequisites:	CHEM 1B (with a grade of "C" or better; "C-" not accepted). <u>Chem 1B may not be taken concurrently with Chem 112A.</u>

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas page for this course. I will also use the email address listed on your mySJSU account regularly to send information on Chem 112A - make sure your email is current. You are responsible for checking for messages on this email on a regular basis to learn of any updates. Many important files will be posted to Canvas, so be sure you check it frequently. If you don't know how or are unable to access Canvas, let me know and I will refer you to the Canvas help desk.

Course Description

Chemistry 112A is intended for students who are interested in a profession in science, engineering, forensics, and related fields. This one-year course sequence (along with Chemistry 112B) will introduce you to the concepts that will lead to a comprehensive understanding of organic chemistry. This course will stress an understanding of these concepts as well as their applications to solve problems. While some memorization of the course material will be required, you will also be expected to apply the underlying principles in the context of problem solving. An emphasis will be placed on a thorough *conceptual* and *mechanistic* understanding of organic reactions. Note that all exams are cumulative for prior material, thus in lecture and exams it is important to recall information that was covered earlier. The final exam will be comprehensive for all material covered this semester. The Course and Program Learning Objectives below give a comprehensive list of topics covered in Chem 112A.

Course Goals and Learning Objectives

- Appreciation for the nature and scope of organic chemistry.
- Application of key concepts from general chemistry including electronegativity, bonding (ionic and covalent), hybridization of atomic orbitals, and molecular orbital theory to organic systems.
- Draw valence bond and Lewis dot structures for organic species, including formal charges.
- Draw skeletal structures for organic compounds, show stereochemistry clearly
- Apply acid-base concepts to organic systems; predict ordering of acid or base strength.
- Name alkanes, alkenes, polyenes, alkynes, alkyl halides, aromatic compounds and their various derivatives using systematic (IUPAC) nomenclature.
- Learn common names for some key chemicals.
- Use bond dissociation energies (BDE's) to calculate reaction energetics.
- Determine oxidation states of organic chemicals.
- Draw reaction mechanisms for polar and radical processes.
- Recognize stereochemistry and be able to apply the Cahn-Ingold-Prelog system to designation of stereochemistry (E/Z or R/S).
- Apply stereochemistry to determination of reaction mechanism.
- Understand the fundamentals of reaction kinetics and be able to apply to the determination of reaction mechanism.
- Learn many of the reactions of alkanes, alkenes, polyenes, alkynes, aromatic compounds, and closely related species. Be able to both predict products and, in many cases, provide probable reaction mechanisms.
- Employ the reactions learned in designing multistep organic synthesis.
- Learn and be able to apply the material presented in Chapters 1-11 and 14-16 in the text (McMurry, 9th edition) as well as additional topics introduced in lecture.

Program Learning Outcome (PLO)

Chemistry 112A satisfies the following Program Learning Outcomes for the Chemistry Department:

#2 Demonstrate understanding of core concepts and to effectively solve problems in organic chemistry

Required* Texts/Readings

*McMurry, John. *Organic Chemistry*, 9th ed., Cengage - The SJSU Bookstore carries the custom SJSU edition bundled with OWL, the online reference tool; this will save you considerably from the commercial version of the text. You are welcome to obtain the hardcover 9th edition of McMurry from another bookseller, but I recommend that it comes with access to OWL (I cannot arrange free access to OWL). Note the 9th edition of McMurry is the "official" version for this section of Chem 112A: readings and problems will only be assigned from this edition, not earlier versions.

*Obtain a pack of Scantron 2020 forms from the Bookstore (these will also be used in Chem 112B).

Optional: A set of molecular models for organic chemistry (a kit by Maruzen is sold by the SJSU Bookstore; other versions may be available from other sources).

Library Liaison

The King Library Liaison for Chemistry is Yen Tran (yen.tran@sjsu.edu).

Course Requirements and Assignments

Catalog Description Chemistry of the carbon compounds, both aliphatic and aromatic, emphasizing underlying concepts. Prerequisite: CHEM 1B (with a grade of "C" or better; "C-" not accepted).

*-> You must have completed Chem 1B with a grade of "C" or better; **you may not take Chem 1B concurrently with Chem 112A!** If you are found to not have completed the prerequisite, I may drop you from this course at any time during the semester.*

The scheduled time for this course is TR 9:00am to 10:15am in Science 142.

Tentative Course Calendar:

A tentative schedule for the semester appears at the end of this document. It is likely that the dates on which specific topics are covered may change depending on the pace of the lectures. If so, this will affect the material covered on each exam. The only way to know what will be on an exam is to be present for all lectures. Note in particular the dates for the Hour Exams and the Final Exam, which are firm dates.

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for **each** unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Course Attendance Policy

***You are required to attend every class meeting of Chem 112A.** DO NOT enroll in this class if work or other issues prevent you from attending every class meeting. Lectures will go over key points and supplement information from the textbook. Additionally, a significant amount of information that I will cover is not found in the textbook and will only be covered in lecture. **In my experience, students who do not come to class regularly do poorly on exams and in this course.** Please arrive in time for the 9:00am start of Chem 112A.*

Dates for all exams are firm - enter these dates on your calendars now. In particular, note the final exam date: **Monday, Dec 16, 2019 @ 0715-0930** – do not make any other plans that prevent you from being present on that day and time (e.g. purchase tickets). ***I will not give the exam at a different time if you are not present*** (except for a verifiable medical emergency).

University policy F69-24: “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Grading Policy

Three "Hour" exams (each 60min) will be given throughout the semester, each with a maximum score of 150 points. The Final exam will be worth a total of 200 points.

You are required to take any two Hour Exams. If you take all 3 Hour Exams, the two highest scores will be used in the calculation of your grade. If you do not take one of the Hour exams,

for any reason, this will be the score which will not be used in the grade calculation. The Hour exams will be given at the start of the lecture period where scheduled. Plan to arrive on time when an exam is given, since all exams will be collected at the same time, no extra time is provided if you start late.

The Final exam will be comprehensive for all material covered in Chem 112A, and will be worth 200 points. The Final exam is required for everyone.

Your final grade will be based on:

300 points for two Hour exams (2 x 150 points) - 30% each hour exam
200 points for the Final (you can't drop the final) - 40% final exam

TOTAL 500 points

Grades will be assigned on a "+/-" system. The course grades will be assigned according the following ranges:

A+ = 100-97%	A = 96-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = <59% Unsatisfactory		

In order to estimate your current grade in this course and progress towards your course grade, keep track of your hour exam scores as the semester progresses. Add the points you obtained and divide by the total points scored up until that time to determine your % of points to that date. Compare the % to the table to estimate your current grade standing. Remember that your two highest hour exam scores will be used in your final course grade calculation. Note that the "class average" for a given exam is *not necessarily a "C" grade*. Grades are assigned by these grade ranges, not by "curves." Be aware that I cannot give any indication or guarantee of a course grade before the end of the semester.

When exams are returned to you, you will often find written comments on incorrect answers. Read these carefully since they not only provide feedback on those exam questions, but are intended to guide you for future exams. The keys for every exam will be posted shortly after the exam is given – I will announce the location. Use this information for a self-assessment of your progress in Chem 112A. Ask me questions if you need clarification.

At the end of the semester, any modifications from the grade ranges above will be in your favor, but you should not expect significant changes from the ranges above. In assigning course grades, only one set of criteria are applied equally to all students in the class - everyone has the same opportunity as everyone else to earn their grade.

Note that "incomplete" grades will only be considered if you have an unexpected situation or emergency that prevents you from finishing the semester. It is required that you have completed most of the course work with a passing grade until that point. A typical situation is a medical emergency that prevents you from taking the final exam - to be considered you must provide documentation and a means to verify the emergency. Poor performance in the class or inability to keep up with the material is not an acceptable reason for an incomplete or to drop the class.

Exam Policies:

- A Scantron 2020 form will be required for the Hour exams and Final exam
- Roll will be taken during exams.
- IDs may be randomly checked so always bring a picture ID (SJSU ID or driver's license)
- Seats will be assigned at my discretion.
- Calculators, computers, cellphones, or any other electronic devices that can photograph, record, and/or transmit images of any kind are **NOT** allowed at your desk during exams. *These must be left in the front of the room. No notes or other sources of information are allowed. Anyone found violating this rule will receive, at minimum, an automatic score of "0 points" for the exam and this exam will be counted as one of the 2 hour exam scores (the second highest score will be dropped). Additional judicial sanctions will apply. See Academic Integrity section below for more details.*

Other Class Policies:

•Audio Recording: audio (only) recording is allowed. Note I do not allow video recording. See also University Policies below.

•Cell Phones: Out of courtesy, turn off ringers and alarms during lectures and exams.

•Computers: You may use your laptop during class lectures only for taking notes or accessing electronic Chem 112A course material as long as they are not distracting (no playing video games or watching videos); computers or any electronic devices are not allowed during exams.

• Exam Makeup and Regrade Policy:

You are required to take any 2 of the 3 Hour exams given. If an Hour exam is not taken *for any reason*, that exam will be the one exam score that is not used in grade calculation. A makeup will only be considered if you miss a second Hour exam due to an unforeseen emergency and provide a documented and verifiable reason. In all cases, you must contact me as soon as reasonably possible. Before any action will be taken, you will be required to provide a verifiable document describing your emergency with the doctor's name and phone number. Note this only applies if you miss a second hour exam.

Absence due to personal or work related issues is not a reason to miss an exam. See the course attendance policy.

Any request for a regrade or recalculation of any exam or quiz must be made *within one week after the exam is returned in class* (if you are not in class the day it is returned, it is your responsibility to obtain your exam from me). No regrades will be considered beyond this time. The exam must be left with me, and I will review the entire exam.

The Final Exam is not returned, but may be viewed in the Spring semester during my office hours. Exams are locked away, so please make arrangements with me a few days in advance. All exams are shredded after one year.

•Emergencies and Building Evacuations

If you hear a continuously sounding alarm, or are told to evacuate the building by an Emergency Coordinator, walk quickly to the nearest exit (facing Tower Lawn). Take your personal belongings as you may not be allowed to return. Follow the instructions of the Emergency Coordinators. Be quiet so you can hear instructions. Once outside, move away from the building. Do not return to the building unless the Police or the Emergency Coordinator announces that this is permissible.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](#) at <http://www.sjsu.edu/gup/syllabusinfo/> **Make sure to review these university and resources.**

The topics include the following:

[General Expectations, Rights and Responsibilities of the Student](#)

[Dropping and Adding](#)

[Consent for Recording of Class and Public Sharing of Instructor Material](#)

[Academic integrity](#)

[Campus Policy in Compliance with the American Disabilities Act](#)

[Student Technology Resources](#)

[SJSU Peer Connections](#)

[SJSU Writing Center](#)

[SJSU Counseling and Psychological Services](#)

In addition to the university policies above, I have additional policies that apply specifically to Chem 112A. Please note the following:

Consent for Recording of Class and Public Sharing of Instructor Material

Audio recording of lectures is allowed. I do not allow video recording of lectures. Much of the material I prepare for Canvas, as well as exams, are prepared by me and are considered my personal property. It may not be shared with anyone who is not enrolled in Chem 112A.

Academic Integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. **The University Academic Integrity Policy S07-2** at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](#) is available at <http://www.sjsu.edu/studentconduct/>.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

For Chem 112A, any form of cheating or unfair advantage will be dealt with seriously in this course, and will result in an appropriate penalty. At minimum, an infraction will result in "0" points for that exam and it will count as one of two Hour Exam Scores (meaning the second highest exam score will be dropped); a grade of "F" for the course may also be given. The SJSU "Policy on Academic Dishonesty" as described in detail in the SJSU Catalog will be the guideline for any action taken, and the case will be referred to the SJSU Office of Judicial

Affairs. The instructor or the SJSU Office of Judicial Affairs may apply more serious penalties. An infraction may also result in a student's name being placed in a Chemistry Department file and other sanctions.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at <http://www.sjsu.edu/aec/> to establish a record of their disability.

Note that accommodations for exams should be made well in advance of the exam date, since both I and the AEC need to make arrangements. Exams taken at AEC must overlap with the date and exam time when the rest of the class takes that exam.

Advice for Students Taking Chem 112A (FROM other students!):

Over the years, I have asked students who have done well in Chem 112A and 112B what their "secrets" are - here are the most common responses:

- keep up with the course, don't ever fall behind
- attend every lecture and take copious notes (listen for hints)
- read the text before and after each lecture
- copy (by hand) your lecture notes soon after the class
- work problems immediately after they are discussed in class (there is no way to catch up if you try to do this just before the exam); do ALL of the problems in the book, problem sets on Canvas, and problems given in class.
- don't memorize answers to specific problems; you need to understand how to determine the answer from principles since questions can be posed in different ways (you need to be able to answer questions that look different from ones in problem sets).
- DO NOT wait until just before the exam to start learning the material!

The common theme to these tips is that they all require you to take responsibility and keep up with Chem 112A in a timely and consistent manner. You will likely hear much griping about how "difficult" O-chem is, but you typically don't hear from the students who follow the advice above and do well in the class. I can't promise success for everyone, but you will very likely do much better if you follow all of these tips listed.

Throughout the semester I will post problem sets and other useful information on the Chem 112A Canvas site (see "Files") - check this site regularly.

MY BEST ADVICE TO YOU:

If you feel at any point in the semester that you are "lost" or not doing as well as you like, come see me or take advantage of the available Resources listed below immediately for assistance. If you wait until right before an exam or until the last few weeks of classes, it will be very difficult to catch up due to the volume of material. Keeping up with the material and working the problems is very important to succeed in Chem 112A. *However, it is also true that spending many hours studying does not necessarily equate to doing well on the exam - what is important that you **understand** the underlying principles and know how to apply them, not just memorize information or know how to answer specific problems from the textbook or sample exams.*

Office Hours and Email Questions:

The University requires me to post 2 hours of office a week, but I regularly schedule at least 3 hours/week. My office hours are times dedicated to assist you and students in all of my courses. They are usually quiet except immediately before exams, so if you have questions, see me well before an exam when my office is relatively open. I will also schedule additional problem or review sessions when I can fit them in to my schedule – watch for announcements in class.

The faculty-to-student ratio for Chem 112A is very high for an upper division organic chemistry course. To maximize the number of student questions, all office hours will be held as "group" problem/question sessions. During office hours, enter my office even if other students are already present (if space allows) - don't wait in the hallway. If a student has a private matter, I will handle this individually. Please also realize that office hours are for all of the courses I teach, not only Chem 112A.

I am also open to email questions at any time, so you do not have to wait until the next office hour. Unless I'm traveling, I try to answer emails 7 days a week, and usually reply within a day (understand that I usually answer these emails on my personal time - I do my best to reply in a timely manner but may not be available every evening or weekend).

My email is roy.okuda@sjsu.edu (put "112A" in the subject line so I know it's not spam)

Some important points regarding email questions:

- If your question is related to a point in the textbook, include the page number or problem number. I don't carry the book with me at all times, so I may need some background to answer your question

- this service is intended for a reasonable number of questions (e.g. 3-4). If you need many questions answered, I will ask you to come to office hours.

- with so many students in 112A (+ my other courses and responsibilities), I need time to prepare for each exam. Thus, the cutoff for email questions will be 24 hours before each exam. You can try within this window, but I can't promise I can get to late emails.

- Email is only for questions about course material and problems. **I will not reply to emails regarding:**

 - exam scores, course grades or personal matters (see me in person)

 - questions on the specific topics to be covered in an exam (this information is given in lecture, which you are required to attend)

OTHER RESOURCES:

- COSAC (College of Science Student Advisory Center) has student tutors who are available for walk-in or scheduled assistance with questions - <http://www.science.sjsu.edu/cosac/> NOTE: they get very busy just before our exams!

- Academic Workshops are primarily problem-solving sessions

- Peer Connections Resource Center (<http://peerconnections.sjsu.edu/>)

All SJSU faculty have the ability to refer students who may need assistance in a specific course to Peer Connections, which has additional means of support besides tutoring. If you receive a message from Peer Connections, I recommend you follow up, as they may be able to assist you!

CHEMISTRY 112A - ORGANIC CHEMISTRY (OKUDA)
Fall 2019

*Tentative Schedule (topics subject to change)**

Changes will be announced *only* in class.

Date	Topic	Reading in Text (9th ed. McMurry)*	Recommended problems (but ALL problems are important!). In addition, see Canvas for more problems.
Aug 22	Introduction; Structure & Bonding	Preface; 1.1 to 1.8	1.1 to 1.12
Aug 27	Structure & Bonding ; Polar Covalent: Acids and Bases	1.9 to 1.12; 2.1 to 2.6	1.13 to 1.57; 2.1 to 2.8
Aug 29	Polar Covalent: Acids and Bases	2.7 to 2.12	2.9 to 2.44; 2.49 to 2.57
Sept 3	Alkanes & Their Stereochemistry	3.1 to 3.4	3.1 to 3.14
Sept 5	Alkanes & Their Stereochemistry	3.5 to 3.7	3.15 to 3.88
Sept 10	Cycloalkanes & Their Stereochemistry	4.1 to 4.5	4.1 to 4.11
Sept 12	Cycloalkanes & Their Stereochemistry	4.6 to 4.9	4.12 to 4.52
Sept 17	Stereochemistry	5.1 to 5.6	5.1 to 5.15
Sept 19	Stereochemistry	5.7 to 5.12	5.16 to 5.77
Sept 24	<i>Hour Exam One**</i>		60 min exam
Sept 26	Overview of Organic Reactions	6.1 to 6.6	6.1 to 6.9
Oct 1	Overview of Organic Reactions Alkenes: Structure/Reactivity	6.7 to 6.11; 7.1 to 7.4	6.10 to 6.42; 7.1 to 7.10
Oct 3	Alkenes: Structure/Reactivity	7.5 to 7.11	7.11 to 7.63
Oct 8	Alkenes: Reactions/Synthesis	8.1 to 8.6	8.1 to 8.12
Oct 10	Alkenes: Reactions/Synthesis	8.7 to 8.13	8.13 to 8.65
Oct 15	Alkynes & Organic Synthesis	9.1 to 9.9	9.1 to 9.42
Oct 17	Organohalides	10.1 to 10.5	10.1 to 10.8
Oct 22	Organohalides	10.6 to 10.8	10.9 to 10.43
Oct 24	<i>Hour Exam Two**</i>		60 min exam
Oct 29	Alkyl Halides: Nucleophilic Reactions	11.1 to 11.5	11.1 to 11.13
Oct 31	Alkyl Halides: Nucleophilic Reactions	11.6 to 11.9	11.14 to 11.19
Nov 5	Alkyl Halides: Nucleophilic Reactions	11.10 to 11.12	11.20 to 11.69
Nov 7	Conjugated Dienes	14.1 to 14.4	14.1 to 14.6
Nov 12	Conjugated Dienes	14.5 to 14.6	14.7 to 14.12; 14.16 to 14.38; 14.45 to 14.50
Nov 14	Benzene & Aromaticity	15.1 to 15.4	15.1 to 15.14
Nov 19	Benzene & Aromaticity	15.5 to 15.6	15.15 to 15.44
Nov 21	<i>Hour Exam Three**</i>		60 min exam
Nov 26	Chemistry of Benzene	16.1 to 16.5	16.1 to 16.13
Nov 28	Thanksgiving		
Dec 3	Chemistry of Benzene	16.6 to 16.8	16.14 to 16.44
Dec 5	Chemistry of Benzene, summary	16.9 to 16.10	16.45 to 16.74

December 16 (Mon), 2019 FINAL EXAM 0715 to 0930**

Readings and problems for this course are based on the 9th edition of McMurry. If you choose to use an earlier edition, you are responsible for any differences from the 9th edition. ***In addition, material not found in McMurry will be included in the lectures.***

*_It is highly likely the dates of coverage of topics may change, depending on the pace of lectures. Any changes from the schedule will only be announced in class. Note attendance is mandatory for every lecture.

****Unless there is a serious calamity, ALL EXAM DATES ARE FIRM. Mark these dates and times on your calendars NOW!**