

West Los Angeles College

Fall 2014
(9/02/14–12/21/14)

Science Division
Chemistry Department

Chem 211–Section 3498
Organic Chemistry 1

Instructor

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Office Hours

M W 4:20-5:05 PM

Room MSA 412

Lecture Hours (3 hrs/wk)
M W 5:10-6:35 PM
Room MSA 403

Laboratory (6 hrs/wk)
M W 6:40-9:55 PM
Room: MSA 412

Course description: Chemistry 211 is an organic chemistry course primarily for students who wish to continue in the fields of chemistry, pharmacy, medicine, dentistry etc

Discussions in this course will include molecular structure of organic compounds, bonding, stereochemistry, short-step synthesis and functional group chemistry with emphasis on reaction mechanisms. The laboratory work focuses on techniques of synthesis, isolation, purification and instrumental analysis of organic compounds. Chem. 211 provides the foundation for further work in Organic chemistry II (Chem. 212) and Biochemistry.

Prerequisites: A grade of C or better in Chemistry 102 is a prerequisite for enrollment in Chem. 211.

Required Lecture Text: Solomons, Graham and Fryhle Craig, "Organic Chemistry" 11th Edition

Required Laboratory Text: Mohrig, Hammod and et al, "Experimental Organic Chemistry" (Macro and micro scale)

Optional Reading Materials: The study guide for Solomons that has solutions to the problems.

The following books are also suggested:

- (a) "Organic Chemistry" by Morrison and Boyd. (b) "Organic Chemistry" by Brown.
(c) "Organic Chemistry" by Ege. (d) Organic Chemistry by McMurry.

Course Requirements and Assignment guidelines:

Read the lecture materials before you come to class and again after the lectures. Please try to come to class on time and stay the whole time. Also, understand that you cannot learn by only attending classes, or by merely reading your notes or textbook. This course requires a lot of practicing in writing molecular structures, names of molecules, and reactions. There is no substitute for continuous effort to work out problems on your own and as a group. You should seek help only after you have done your best to solve the problem. You are encouraged to form a study group and meet periodically to solve chemistry problems. You will learn more by explaining /teaching concepts to others.

Quizzes: Approximately eight unannounced quizzes will be given during the semester. These short quizzes will cover the topic or topics assigned to be covered that day in class or earlier. Students are responsible for background reading on these topics. Spectroscopy concepts and problems will be included in the quizzes.

Homework: Several homework assignments will be required.

Class Policies:

Walking In and Out of Class: When you arrive to class, make sure you have used the restroom, had a chance to eat, check your messages, etc. Walking in and out is rude and disruptive. If you need to leave early, or have some other problem, you need to notify me in advance. Any student who makes a habit of walking in and out of class may be asked to leave.

Cell Phones, iPods, ipads, laptops, etc.

Turn them off and put them away when class begins! Although it may not seem possible, you can survive without talking and texting on your cell phone, or listening to your iPod, for a little over an hour. Talking and texting on cell phones not only distract you, but they are a distraction for me and your peers.

Distractions interrupt/disrupt the class: I will not tolerate interruptions. You will be asked to leave, if this occurs.

Withdrawal from Class: You are responsible for your credit and enrollment status. Any student withdrawing from class must officially inform the admissions office of his/her decision. Students who fail to follow the correct procedure for withdrawals will receive a grade of F for the course at the end of the semester. For important deadlines, please refer to the Fall 2013 semester class schedule.

Attendance: You are expected to attend all lectures and labs. You are responsible for information, exam announcements, date changes, etc. presented in class, whether or not you are present. Students who are absent for 3 consecutive class meetings or 6 class meetings throughout the course without presenting a valid excuse could be dropped from the class.

The college academic honesty policy (please read catalog) will absolutely be upheld in this course. Neither cheating nor copying will be tolerated.

Course Grade:

Examination and Final Grade Distribution: Final exam in the lecture will **be comprehensive**. Final grades will be assigned primarily on the basis of points accumulated as follows:

Activity	%	Points
Exams (3x100)	40	300 pts
Final Exam	20	150 pts
Quizzes	13.3	100 pts
Lab	20	150 pts
Homework	6.7	50 pts
Total	100	750 pts

Final Grade Distribution	
A	100 - 89%
B	88 - 77%
C	75 - 65%
D	64 - 50%

A passing grade will be contingent on successful completion of assigned experiments.

Makeup Labs and Exams:

Labs: There will be no make-up labs. A grade of zero will be assigned for a missed lab

Exams: A make-up exam may be considered by the instructor only in case of a documented extenuating personal or family emergency.

During Exams students may leave the exam hall only after submitting their exam paper to the instructor. A student who has left the hall for any reason during the exam may not be allowed to come back and finish the exam or make any changes in his/her answers.

A student, who comes to the exam hall after the exam is started, may not be allowed to take the exam if at least one student has left the exam hall before he/she came into the hall.

Laboratory:

Chemistry 211 is a laboratory course. Failure to perform the experiments and hand in the work on time will result in an unsatisfactory grade in the course. For reasons of safety, lab work must be done only during the assigned laboratory periods and in the presence of an instructor.

NOTE: You must wear eye protection whenever you are in the lab. If you do not have the appropriate eye protection you may be dismissed from the laboratory section with loss of credit for that exercise.

Do not wear contact glasses in the lab. They can absorb or trap some organic vapors and fumes and could cause eye damage. Eating or drinking in the lab is prohibited. Read the instructions and the procedure for the experiment before coming to the lab. Preparing flow charts before coming to the lab will help you to finish the experiment in time and prevents avoidable accidents from happening.

Recommended Collateral Reading: Laboratory Techniques- Pavia, Lampman, and Kriz

Additional Supplies:

- (a) Safety Glasses - goggles or industrial quality safety glasses. Normal prescription glasses are not satisfactory.
- (b) A hard cover bound composition notebook to record results and observations in the lab.

Reading Assignments: It is important to complete reading before class to maximize benefit from the laboratory work. Particular attention should be focused on experimental procedures and safety. Be sure that you have an understanding of the objective before you begin laboratory work.

Prelab preparation and effective use of laboratory time: Laboratory time is limited. It is important to prepare carefully for the assigned experiment so as not to waste time. Furthermore, understanding the experimental procedures will enhance laboratory safety. An outline of the experimental procedure should be written on paper separate from the notebook. This information will provide the basis for your laboratory work. The actual work you carry out will be recorded in the notebook. Laboratory quizzes will contain questions to ensure prelab preparation.

Final Lab Examination: A final written examination will be given during the last lab meeting in the regular laboratory classroom. The exam will be comprehensive and is required of all students.

Lab Grading: Grading will be based on credit awarded for various activities distributed as shown below.

Activity	Points
Lab Reports	80 points
Participation	20 "
Prelabs	25 "
Lab Exam	25 "
Total	150 "

Note: Attend all labs. Come ready with a written pre-lab. Wear goggles all the time while in the lab. Clean up your work place before you leave lab. Never throw chemicals into the sink. Ask for waste collection jars. Turn in reports on time.

In grading labs, I will be looking for the following:

- The Title of the experiment.
- The date on which the experiment is performed.
- Your name and your lab partner's name, if any.
- Abstract: a brief summary of purpose, procedure, results, etc
- The procedure that you followed. This may be in outline form i.e. a list of steps that you followed or if you are using a procedure from a book or journal, you may refer to that book or journal, you do not have to recopy the whole lab procedure. For example, you may write "Followed procedure in Mohrig, -- page 35, with the following changes -----". Also, you need to give a flow chart.
- Your observations, which should include: color changes, formation of precipitate, temperature changes.
- List of chemicals & masses (and possibly volumes) and physical properties (MP, BP, molar mass, density etc) of reactants and products used.
- A balanced equation for all reactions (if any).
- Calculate the % yield (or recovery) of products. Show all work.
- The physical properties of products: Color, crystal size and shape, smell, etc. IR spectrum.
- Determine (by experiment) the melting, boiling point of your product and compare to the melting point or boiling point of the pure product. (This can be obtained from the CRC Handbook or Merck Index)
- Discussion: Explain any possible errors (like poor yield or 100+ % yield).
- Lab Reports are due one week after you complete the experiment. Late reports will lose 2 points per lab day.
- Each experiment will be graded on a scale of 10 points.

PRODUCTS: The products i.e. the compounds you synthesize or recover will be collected and checked for amount and purity.

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Tentative Lecture and Lab Schedule

Chem 211 Fall 2014 (9/01-12/21)

wk	Date	Lecture Text: Organic Chemistry, Solomon; 11 th Ed		Lab Text: Organic Experiments, Mohrig	
		Chapter	Topic	Experiment	
1	9/03	1.1-1.11	Bonding and Molecular Structure	Check in / Safety Video /Quiz	
2	9/08	1.12-1.23	Chemical Bonding -continued	Melting points: Known and Unknown	H/O
	9/10	2.1-2.8	Families of Carbon compounds	Recrystallization	H/O
3	9/15	2.9-2.16	Carbon Compounds -continued	Distillation: Simple and Fractional	H/O
	9/17	3.1-3.8	Introduction to Org. Rxns.:Acid/Bases	Gas Chromatograph: Introduction	H/O
4	9/22	3.9-3.16	Acids/Bases - continued	Extraction of Caffeine from Tea	E2
	9/24	4.1-4.8	Nomenclature: Alkanes & Cycloalkanes	IR: Introduction and Instrumentation	H/O
5	9/29	4.9-4.16	Conformation: Alkanes & Cycloalkanes	Synthesis of Alcohol by Fermentation	E3
	10/01	5.1-5.8	Stereochemistry: Chiral molecules	Synthesis of Alcohol Continued	
6	10/06	5.9-5.16	Stereochemistry - continued	Exam 1 (Chapters 1-4)	
	10/08	6.1-6.6	Ionic Reactions: Alkyl halides	Molecular Modelling	H/O
7	10/13	6.7-6.14	SN1 SN2 substitution reactions	Synthesis of Salicylic Acid	E4
	10/15	6.15-6.18	E1 E2 Elimination reactions	Synthesis of Aspirin	E5
8	10/20	7.1-7.7	Alkenes and Alkynes I: Properties	Synthesis of Ether	H/O
	10/22	7.8-7.14	Alkenes and Alkynes : Preparation	Ether – continued (analysis)	
9	10/27	8.1-8.10	Alkenes and Alkynes II: Addition Rxns.	Exam 2 (chapters 5, 6 & 7)	
	10/29	8.11-8.20	Regiochemistry and Stereochemistry	Isolation of carvone from Caraway Seeds	E6.1
10	11/03	9.1-9.6	NMR: Nuclear Magnetic Resonance	Isolation of Limonene from Orange Peels	E6.2
	11/05	9.7-9.12	NMR -continued	Preparation of Alkyl Bromide	E9.2
11	11/10	9.13-9.16	Mass Spectrometry	NMR and MS Discussion	
	11/12	10.1-10.6	Radical Reactions	Separation and Purification of the Compounds in an Unknown Mixture	P2.1 P2.2
12	11/17	10.7-10.12	Radical Rxns - continued	Separation of Mixture - continued	
	11/19	11.1-11.8	Alcohols and Ethers	Dehydration of 2-methy-2-butanol	P6.1
13	11/24	11.9-11.16	Alcohols and Ethers - cont	Exam 3 (Chapters 8, 9 & 10)	
	11/26	12.1-12.5	<i>Alcohols from carbonyl compounds Day before Thanks Giving</i>	Dehydration - continued	
14	12/01	12.6-12.9	Reduction of Carbonyl compds and organometallic compounds.	Bromine addition to <i>trans</i> -cinnamic acid	E16.2
	12/03	13.1-13.5	Conjugated Unsaturated systems	Preparation of vanillin	H/o
15	12/08	13.6-13.10	Review for final exam.	Check out and Lab Final	
	12/10		Review for final exam.		
16	12/15		Final Exam 5:10-7:10 PM (Chapt 1-13)		

E – Experiment

P – Project

H/O - Hand Out

Course SLOs:

Demonstrate understanding of basic organic chemistry concepts Understanding the differences or similarities of concepts	In tests and final exams, during discussions and lab reports: Short oral questions are asked during lecture to check the students understanding of concept being discussed Students are asked to choose, from many possible reactions, the best method of synthesizing a given compound
Know the IUPAC names and structural formulas of organic compounds	Students are asked to write the names/and structural formula (including stereochemistry) of organic compounds
Rationalize reaction mechanisms Compare differences in reaction mechanisms.	Students are asked to discuss a reaction mechanism that involves addition, substitution, elimination and rearrangement Students are asked to explain the mechanism of a reaction based on the property (ex. optical activity) or structure(ex. Stereochemistry, rearrangement) of products formed
Explain relationships between molecular structure and properties of compounds. Recognize the effect of reaction conditions on the mechanism of the reaction	Students are given structural formula of compounds and asked to predict the physical and chemical property of the compound qualitatively. Questions are asked to predict the major product of a reaction based on reaction conditions, size of the reacts, and nature of the reagents used (effect of : solvent, structure, size and nature of substrate and nucleophile / base, temperature etc) -Students are asked to give reaction conditions that will favor one reaction mechanism over the other in a competing reaction (SN1 Vs SN2, E1 Vs E2 or substitution Vs elimination reactions) - Students are asked to propose a multi-step synthesis of a given compound
Organize and apply chemical knowledge	Students are asked to show their collected data to the instructor before leaving the lab.
Observe and collect experimental data accurately. Identify basic laboratory equipment	Students are asked to set-up their own experiments Students are required to use (operate) lab equipment for analysis
Purify samples Use appropriate lab equipment and chemicals	Students are asked to purify their products using physical means (recrystallization, distillation, filtration etc) Students are required to use (operate) lab equipment for analysis
Determine purity of products	Students are required to determine the purity of their products and include it in their reports Students are asked to identify unknowns

-Analyze the data and come to conclusions, and write a report.	Students are required to write a lab report based on their observations and discuss their results in the report and write their conclusions. The reports are collected and graded for accuracy, organization, analysis, and synthesis of information
-Calculate and compare percent yields of reactions	- Students are required to calculate percent yield of their reactions and include it in their report
-Explain observations	Students are required to systematically and logically: Characterize samples Classify unknowns Identify unknowns

Program SLOs:

Utilize an appropriate and effective scientific methodology to analyze chemical and physical processes in the work place and in everyday living.	Students are asked to apply learned information in solving multi-step synthesis problems Projects that show the application of chemistry in industry and in day-to-day life are assigned -Group work/discussions are assigned
Explain and analyze the chemical world “as chemistry is the basic science with connections to many careers.	Students are asked to read current scientific journals and write report on the topic
Research and interpret scientific literature.	Students are asked to methodically and logically characterize, classify and identify unknown organic compound samples

Institutional SLOs:

-Critical thinking -Quantitative reasoning -Technical competence	
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