West Los Angeles College Fall 2015 Semester

Chemistry 211 (Organic Chemistry 1)

Instructor: Dr. Mesfin Alemayehu

Lecture:	**T**	**Th**	**11:10 – 12:35pm**	**Rm: MSA 302**
Lab:	**T**	**Th**	**12:40 – 3:55 pm**	**Rm: MSA 412**

Office hours: M, W 10:05 - 11:05 am & T, TH 9:30-11:00 am Rm: MSB 209

Tel: (310) 287-4299

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Course description

Chemistry 211 (formerly Chemistry 14) 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 ll (Chem. 212) and Biochemistry.

Lecture hours per week: 3 Lab hours per wee: 6

Prerequisites:

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

Text Book:

Lecture: Solomons, Fryhle "Organic Chemistry" 11th Edition

Lab: Mohrig, Hammod and et al, " Modern Projects and Experiments in Organic Chemistry" (Minisccal and Williamson Microscale) 2nd edition

Optional Reading Materials:

There is also a study guide for Solomons that has solutions to the problems. The following books are also suggested: "Organic Chemistry" by Morrison and Boyd, "Organic Chemistry", "Organic Chemistry" by Brown; "Organic Chemistry" by Ege. Please understand that you can not 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. You should seek help only after you have done your best to solve the problem.

Student Learning outcome (SLO): **Upon successful completion of chemistry 211, the you will be able to:**

- Recognize and explain the bonding in organic compounds.
- Recognize and name major organic functional groups-: Alkane, alkenes, alkynes, haloalkanes, alcohols, ethers, alkyl halides, including their structure and bonding; physical and chemical properties, methods of preparation; reactions and mechanisms
- Interpret IR spectrum
- Draw the structural formula and the name of organic compounds.
- Do conformation analysis of alkane.
- Recognize the different types of Isomerism including stereoisomers.
- Explain the relationship between structure of an organic compound and its properties.
- Demonstrate knowledge of the following reaction intermediates: Radicals, Carbocations, Carbanions and Carbenes
- Understand and explain Resonance and Inductive effects on the stability of intermediates
- Predict reaction mechanisms as SN1, SN2, El, E2, radical or electrophilic addition reactions, based on structure and reaction conditions
- Apply Lab safety rules
- Be familiar to basic organic chemistry laboratory techniques and develop lab. skills
- Set-up an experiment
- Demonstrate the use of some basic lab. equipment and analytical instruments to identify organic compounds
- Explain observations
- Apply theory in lab work
- Analyze data and come to a conclusion
- Calculate physical and chemical quantities
- Measure physical quantities
- Apply scientific methods in solving problems
- Prepare organic compounds in two or three steps
- Practice the safe use of chemicals
- Demonstrate skills and laboratory techniques for purification of organic compounds, separation of mixtures, extaction of natural products and short step synthesis of drugs.
- Write laboratory reports based on collected experimental data and results

Laboratory:

Chemistry 211 is a lecture and laboratory course. Failure to perform the experiments and hand in the work 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 when the instructor is around.

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.

Record all the data (including your observations) **in ink in a stiff-covered bound** lab notebook. Have your lab instructor sign your notebook before you leave the lab at the end of the each lab period.

Your Report Should Contain the Following Sections:

A. (Pre-lab : should be completed before coming to lab))

I. Date the experiment was performed

II. Title of the experiment

III. Objective of the experiment (this is a brief statement of the purpose of the experiment)

IV. Chemicals and reagents used (include their molecular formula, molar mass, mp, bp, amounts used, reaction equations if known, etc.)

V. Procedure (at least indicate name and page of source)

B. (During lab: To be recorded carefully during experiment in lab)

VI. Observations/data: Any observation made during the experiment (data collected, color changes and other visible changes) should be recorded.

C. **(Post-lab: To be completed after the experiment is done, using the observations and data obtained in part B)**

VII. Calculations and graphs

VIII. Discussion and conclusions: If possible, compare your results to known (accepted) values (consult your textbook, and physical or chemical handbooks and indicate your reference source). Comment on the results you obtained in relation to the principles of the experiment and the acceptable value from literature.

There are some services on campus for students with learning disabilities. Such students may contact the office and get the appropriate help and accommodations

Lab Grade Distribution:

Attendance	50 pts
Pre-lab report	30 pts
Participation in lab	30 pts
Lab Exam and report/write up	40 pts
Total Lab Points	150

Examination and Final Grade Distribution:

During exams students may leave the exam hall only after submitting their exam paper. A student who left the hall for any reason 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.

Cell phones and Beepers must be completely turned off during class time.

Final exam in the lecture will **be inclusive.** Final grades will be assigned primarily on the basis of points accumulated as follows:

3 lecture exams	300	pts
1 final exam	250	pts
Performance in lab	150	pts
Student project	50	pts
Total Points	750	pts

A starts at 85% B starts at 75% C starts at 60% D starts at 50%

A passing grade will be contingent on successful completion of assigned experiments. There will be no **make-up lab** or **exam.** A grade of zero will be assigned for a missed lab or exam. 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.

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**.

Last day to drop without a "W" is September 11, 2015

Last day to drop with a "W" is November 20, 2015

If the dates fall on a holiday , use the telephone registration system to drop classes

For important deadlines, please refer to the fall semester class schedule.

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

TENTATIVE LECTURE SCHEDULE

Week of	Lecture Topic	Chapter Reading
Aug. 31 1	Carbon compounds and chemicalbonds	1
Sep. 7	Representative Carbon compds. Functional groups, IR	2
Sep. 14	An introduction to organic reactions-acid and base	3
	EXAM # 1	
Sep 21	Alkanes, Nomenclature, Conformational analysis and introduction to synthesis	4
Sep. 28	Stereochemistry -chiral molecules	5
Oct. 5 &Oct.12	Ionic Reactions- Nucleophilic substitution and Elimination reactions of alkyl halides	6
	EXAM # 2	
Oct. 19	Alkenes and Alkynes I. –Preparation and synthesis	7
Oct.26 & Nov. 2	Alkenes and Alkynes II. –Addition reaction	8
Nov. 9	NMR and Mass Spectroscopy Tools for Structure Determination	9
	EXAM # 3	
Nov. 16	Radical Reactions	10
Nov. 23	Alcohols and Ethers	11
Nov. 30	Alcohols from carbonyl compds, Oxidation-Reduction and Organometalic compds.	12
Dec. 7	Conjugated unsaturated systems	13
	Dec. 15, 2015 FINAL EXAM	

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Chem. 211 Tentative Lab Schedule

Lab No.	Title	source	No. of lab periods
1	Check in & Orientation	**Video**	1
2	Melting point determination	**Handout**	1
3	Recrystallization	**Handout**	1
4	Distillation	**Handout**	1
5	Orientation and the use of, analytical instruments (GC, IR…)		1
6	Extraction of Caffeine from tea	**Mohrig (E. 1)**	1
7	Synthesis of ethanol by Fermentation	**Mohrig (E. 3)**	2
8	Molecular Modeling	**Handout**	2
9	Synthesis of Salicylic acid	**Mohrig (E. 4)**	1
10	Synthesis of Aspirin	**Mohrig (E. 5)**	1
11	Analysis and comparison of products from **E. 4 and E.5** (Chemical, MP, IR)		1
12	Synthesis and analysis of Ethers (GC and IR)	**Handout**	2
13	Saponfication	**Handout**	1
14	Isolation of Limonene from Orange peels	**Mohrig (E. 6.2)**	1
15	Preparation and Identification of Alkyl bromide	**Mohrig (E. 9)**	2
16	Using extraction to separate a mixture	**Mohrig (P 2.1, 2.2)**	2

17	E1/E2 Elimination	**Mohrig (P. 6.1, 6.2,6.3 &3.)**	2
18	Stereochemistry of bromine addition to trans- cinnamic acid	**Mohrig (E. 16.2)**	1
19	Dehydration of alcohols	**Mohrig (E.11)**	1
20	Preparation of Vanillin	**Handout**	**1**
21	Checkout		1

E = Experiments, P = Projects