

CHEM 312/316 Syllabus – Spring 2015

Course Code: CHEM 312 and CHEM 316
Course Title (credits): Organic Chemistry Lecture (3) and Lab (1)
Term and Year: Spring 2015
Course Ref. No. (CRN): CHEM312: 10090 CHEM316: 10091

Instructor: Sean Ryland
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Office: TBD
Office hours can be arranged by appointment

Lecture Meeting Time: MW 10:00-11:15 AM
Lab Meeting Time: M 1:00-3:45 PM
Location: TCES202

Prerequisites: CHEM 311
Corequisites: CHEM 312 and CHEM 316

Course Description:

CHEM 312: Continues the study of carbon compounds with an introduction to modern spectroscopic characterization techniques. Also includes the chemistry of aromatic compounds, ethers, epoxides, aldehydes, ketones, and carboxylic acids and their derivatives. In addition to the focus on reaction mechanisms developed in CHEM 311, emphasis is placed on the techniques and strategies of synthetic chemistry.

CHEM 316: Continues the development of the laboratory skills of organic chemistry. Includes the characterization of alcohols, alkyl halides, aldehydes, ketones, and esters, as well as the development of more complex multi-step synthetic sequences. The fundamentals of polymer synthesis, photochemistry, and instrumental analysis are also explored.

Student Outcomes:

Students successfully completing these courses will demonstrate the following:

- Understanding of fundamental organic chemistry concepts sufficient to explain the concepts to other scientifically minded individuals.
- Problem solving skills sufficient for predicting organic chemistry reactions and mechanisms.
- Ability to successfully answer questions regarding organic chemistry nomenclature, reaction mechanisms and molecular properties in formats similar to common standardized tests such as the MCAT and GRE.
- Competence in basic organic chemistry lab techniques and safety, including the ability to write and follow a laboratory procedure using standard operating procedures.
- Competence in maintaining laboratory notebooks and ability to write laboratory reports.

Methods for Assessing Student Outcomes:

Weekly homework assignments, two hour exams and a comprehensive final exam will be used to assess student knowledge and competence. Written laboratory reports will be assigned to evaluate student mastery of laboratory techniques and concepts.

Learning Strategies:

Organic Chemistry II and Lab will use texts oriented to understanding concepts and problem solving, lectures, assigned homework problems for each chapter, class problem solving sessions. In laboratory exercises, students must prepare a laboratory plan, keep a notebook of laboratory results, and compile a laboratory report to communicate a body of knowledge, concepts, and skills related to organic chemistry and scientific research. Student study groups outside of class time are highly encouraged.

Instructional Texts:

CHEM 312:

1. Paula Y. Bruice, Organic Chemistry 6th ed. (Pearson, ISBN 10: 0321727010).
2. Molecular Model Set for Organic Chemistry
3. Optional: P.Y. Bruice, Organic Chemistry Study Guide and Solutions Manual 6th ed. (Pearson, ISBN 10: 0321676823).

CHEM 316:

1. Donald L. Pavia, et al. Microscale Approach to Organic Laboratory Techniques, Fourth Edition. (Brooks/Cole - Cengage Learning, ISBN-10: 1-133-10652-8).

Attendance:

Attendance will not be graded. HOWEVER, any higher education course demands a substantial time commitment, organic chemistry more than most. Missing a lecture will result in forfeiture of credit for any in-class work. Laboratory reports will only be accepted from students who have completed the lab exercise. Laboratory exercises can be made up at the discretion of the instructor. Acceptable excuses include, but are not limited to, illness (of the student or a dependent) with a physician's note, military duty or family bereavement. Oversleeping or conflicting employment schedules are NOT acceptable excuses.

Sanctions for Academic Dishonesty:

For a comprehensive definition of what is considered cheating or plagiarism, please refer to the Sierra Nevada College Course Catalog. In short, academic dishonesty is representing another's work or thoughts as your own or fabricating results. For the first offense, the student receives a zero for assignment/exam and/or a determination by the faculty if the student should fail the course is made. Counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning are provided. In the event of a second offense, the student will be expelled.

Special Accommodations (ADA) Statement:

"In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, contact the Director of Student Services (Prim Library room 323) at (775) 831-7799 x7534 within the first week of the semester."

Grading Policy:

Identical letter grades will be awarded in CHEM 312 and CHEM 316 according to standard grading conventions as follows. A: >90%, B: 80-90%, C: 70-80%, D: 60-70%, F: <60%. Plus and minus grades will be awarded accordingly. Grades will be determined as follows:

Homework:	15%
Exams:	30%
Laboratory Reports:	20%
Final Exams:	25%
Laboratory Final:	10%

Homework: Homework will be assigned and collected weekly. Through the appendices at the end of the text and the solutions manual, answers for every homework question are available. PLEASE use these resources as a means of evaluating your own understanding. DO NOT copy answers blindly from these sources; if you do so, not only is it obvious to the instructor, you are undermining your own success in the class.

Exams: Exams will be given with at least two weeks notice, but it is recommended that students study and complete homework assignments at all times. Make up exams may be given at the instructor's discretion, but only in the most extreme cases. After **one** exam, a student can choose to complete a blank exam outside of class in order to add one third the number points missed on the exam to the exam score. For instance, a student who scored a 70% on an exam who can complete the exam outside of class will receive a readjusted score of 80% for that exam. The retaken exam must be filled out 100% correctly in order to receive any additional credit. This exam adjustment cannot be used for an exam for which the student was not present. **If an entire class does poorly on an exam, the instructor reserves the right to adjust this policy, or choose the exam for the students.**

Final Exam: the Final Exam will be comprehensive. The format will be similar to the previous exams and will be administered at the scheduled final exam slot as scheduled by SNC.

Lab Reports: The format of Lab Reports will be discussed during the first lab session. Students will be allowed to drop the scores of two lab reports from their final grade in order to account for absences and unforeseen circumstances. Please, DO NOT skip lab exercises just because you can; you might end up needing to skip lab for unforeseen circumstances later in the semester. Students who complete all lab reports will be allowed to average the percentage of their two worst lab report scores instead of taking the laboratory final.

Laboratory Final: The Lab Final will consist of a take home final that emphasizes the use of problem solving skills in chemical settings. Any material previously covered in lab or in lecture may be covered, as well as questions regarding proper use of glassware, lab safety and instrumental analysis.

Due Dates and Late Work: Assignments (Homework, Lab Reports and Exam Adjustments) are due at the beginning of class the day they are due. Once class has started, assignments are docked 10% of the total points possible. Every day following, the assignments lose an additional 10%. Assignments more than 5 days late will not be accepted.

Advice from a Former Student: Be present and awake in class and lab. I know it's not possible to pay attention every minute of every lecture, but I will provide plenty of opportunities for students to discuss material during class, which should help you absorb the material and stay awake. Try not to fall behind, as that will impact your ability to comprehend the new material being presented. Do not be afraid to ask me or others for help with difficult concepts, but put a significant amount of time into the problem before you come to office hours if you want to get anything out of it.

Acknowledgements:

Thanks to Dr. Tom Clarke for the use of his syllabi in crafting this syllabus.

The instructor reserves the right to change this syllabus at any time if it is in the best interests of the students.

Tentative Course Schedule:

WEEK	DAY	DATE	TOPICS	CHAPTERS	Lab
1	T	Jan 20	Review	N/A	Exp 18: Ethanol from Sucrose: Fermentation and Fractional Distillation
	TH	Jan 22	Aromaticity	Chp. 15	
2	T	Jan 27	Reactions of Benzene	Chp. 15	
	TH	Jan 29	(De) Activating Benzene	Chp. 16	
3	T	Feb 03	Benzene Substitutions	Chp. 16	Exp 56: Friedel-Crafts Acylation
	TH	Feb 05	Carbonyl Groups	Chp. 17	
4	T	Feb 10	Carboxylic Acids	Chp. 17	Exp 20: Computational Chemistry
	TH	Feb 12	Carboxylic Acid Derivatives	Chp 17	
5	T	Feb 17	Reactions of Aldehydes	Chp. 18	Exp 42: Benzocaine
	TH	Feb 19	Reactions of Ketones	Chp. 18	
6	T	Feb 24	α - β Unsaturated Carbonyls	Chp. 18	Exp 32: Multistep Reaction Sequences (pt. 1)
	TH	Feb 26	Reactions at the α -Carbon	Chp. 19	
7	T	Mar 03	Reactions at the α -Carbon	Chp. 19	
	TH	Mar 05	Synthesis	Chp. 15-19	
8	T	Mar 10	Exam #1 Review	Chp. 15-19	Exp 27: Biodiesel
	TH	Mar 12	Exam #1	Chp. 15-19	
	T	Mar 17	Spring Break		
	TH	Mar 19			
9	T	Mar 24	Mass Spectrometry	Chp. 13	Exp 4: Extraction of Caffeine
	TH	Mar 26	IR Spectroscopy	Chp. 13	
10	T	Mar 31	UV/Vis Spectroscopy	Chp. 13	Exp 17: Isolation of Chlorophyll from Spinach
	TH	Apr 02	NMR Theory	Chp. 14	
11	T	Apr 07	Proton NMR	Chp. 14	Exp 65: Esterification Reactions of Vanillin
	TH	Apr 09	Other NMR Spectra	Chp. 14	
12	T	Apr 14	Redox Reactions	Chp. 20	Exp 53:Preparation of an Acetate Ester
	TH	Apr 16	Redox Reactions	Chp. 20	
13	T	Apr 21	Amines	Chp. 21	LAB FINAL Exp 54: Extraction and Identification of Essential Oils by Steam Distillation
	TH	Apr 23	Heterocycles	Chp. 21	
14	T	Apr 28	Special Topics 1	TBD	
	TH	Apr 30	Review for Exam #2	TBD	
15	T	May 05	Exam #2	TBD	LAB FINAL DUE Final Exam Review
	TH	May 07	No Class (Final Prep)	N/A	
16	T	May 12	11:30 AM-2:30 PM Final Exam		N/A