GENERAL INFORMATION
CHEMISTRY12A (CHEMD012A62) Winter 2018
Instructor: Chad Miller E-mail: millerchad@fhda.edu

Lecture (CRN32209/10)	**Tuesday & Thursday**	**3:30PM – 4:45PM**	**Room MLC105**
Lab (CRN32210)	**Tuesday & Thursday**	**11:30AM – 2:20PM**	**Room SC2210**
Office hours	**Tuesday**	**9:30AM – 10:30AM**	**Room M S43**
	Thursday	**5:00PM – 6:00PM**	**Room MLC105**

Course Description: Chemistry 12A is the first quarter of a year-long organic chemistry class for chemistry majors and various pre-professional tracks. Topics covered in lecture include the fundamentals of organic reactions, including the structure of organic molecules, functional groups, isomers, stereochemistry, regiochemistry, mechanisms, and retrosynthetic analysis. These core concepts will provide the framework for exploring two classes of organic compounds, hydrocarbons and haloalkanes. The former of these to be studied include alkanes (C-C) and alkenes (C=C) while the latter is composed of an alkane containing a halogen. To bridge the gap between general and organic chemistry, this course also includes a brief review of bonding, thermodynamics, kinetics, and equilibrium, tailored to the reactivity of organic molecules. A grade of C or better in General Chemistry lecture and lab (Chem1A-1C) is a prerequisite.

Required Materials:

- ✓ **Text Book**: *Organic Chemistry, 3e,* by David Klein (Inclusive Opt-In Access Included with Class Sign Up)
- ✓ **Lab Text:** *Experimental Organic Chemistry: A Miniscale and Microscale Approach, 6e,* by *John C. Gilbert* and *Stephen F. Martin* (Brooks/Cole: 2015; ISBN 978-1-305-08046-1)
- ✓ OSHA-approved **Safety Goggles** (Indirect Vent, Z87)
- ✓ **Carbonless copy Lab notebook:** 100 page carbonless copy spiral bound notebook. ISBN: 1429224541
- ✓ **Standard lock for lab drawer** (or small bike lock) to lock an assigned laboratory drawer.

Recommended:

- ✓ Molecular model kit for organic chemistry – many options available
- ✓ Lab coat, Lab gloves (disposable nitrile or otherwise compatible)
- ✓ *Pushing Electrons, 4e*. Daniel P. Weeks

Important Dates: Please note the following dates

- ☑ ***Jan 8/9*: Attend 1/09 lecture and 1st lab meeting on 1/08 or 1/09 as you are registered in this course.**
- ☑ ***Mar 02*: Deadline to drop a 12-week class with a grade of 'W'**
- ☑ ***Mar 27*: Final Exam date. 4:00PM – 6:00PM Lecture room**

Classroom Courtesy: We want to achieve the highest level of learning experience in lecture and in lab and to accomplish that please refrain from conducting any unrelated conversations, cell phone activity (no calls, texts, IMs, browsing or camera use) and any other behaviors that would be disruptive to yourself, others and to the instructor. Students who engage in disruptive conduct will be required to leave the classroom. Computers in the lectures and lab can only be used for activities pertaining to the course material. Recording class lectures or related activities always requires approval of the instructor.

Attendance & Academic Integrity: Students are expected to attend all lectures and labs. The course Grading Policy details the specifics for lack of attendance. All incidents of dishonest, unethical behavior including any cheating, copying the work of others and claiming it is your originality (also known as plagiarism), altering any graded exams, quizzes, lab reports, other classroom materials will be reported to the College Administration. It is your responsibility to recognize academic dishonesty: http://www.deanza.edu/studenthandbook/academic-integrity.html

Instructional and Student Resources: DeAnza College provides a variety of resources to facilitate learning experiences including those listed below. Please visit http://www.deanza.edu/studentservices/ to learn more.

- **Student Success Center:** http://www.deanza.edu/studentsuccess/ Tutoring is available for on-site and online tutoring on a range of subject matter including chemistry. Resources are in Bldg S43.
- **Counseling and Advising Center:** http://www.deanza.edu/counseling/ Provides support in the form of counseling and assistance on academic matters and personal challenges.
- **Disability Support Programs & Services**: http://www.deanza.edu/dsps/ Offers support services including accommodations and educational classroom assistance designed to help students with disabilities. Resources are in the RSS Room141 and can be reached at 408.864.8753.

GRADING POLICY CHEM12A Chad Miller Winter 2018

Assessment	Points Each	Total Points	Percent
Lab reports, pre-labs, technique	variable	150	15%
Lab exam and lab quiz set	90	180	18%
Lecture quiz 1, 2	60	120	12%
Midterm 1, 2	150	300	30%
Final exam	250	250	25%
Total		1,000	100%

Grade	% of Total Points	Grade	% of Total Points
A+	98% - 100%	B-	77% - 79%
A	91% - 97%	C+	74% -76%
A-	88% - 90%	C	65% - 73%
B+	85% - 87%	D	55% - 64%
B	80% - 84%	F	<55%
% of total points determines the letter grade			

Lab Assessments:

1. Competency in experimental principles will be assessed by a Lab exam and two (2) periodic quizzes.
2. Laboratory experience is an essential component of this course and each lab must first be prepared for in advance by submitting the 'pre-lab' assignment, then the lab must be attended and properly and safely conducted followed by the timely completion and submission of the lab report.
3. The format, structure and information content which are expected in pre-lab assignments and lab reports will be fully described during the first lab meeting. Attendance at the first lab meeting is a requirement to remain registered in this course.
4. All submitted written work in the lab (i.e., pre-labs and lab reports) must be of the student's original authorship regardless if the lab was performed individually or with a lab partner. On occasion, students may share experimental data however all lab reports must be individually written. Submitted work that is copied from another student will be scored as '0' (zero) points and such student will receive one warning regarding academic dishonesty. Any additional copied reports that are submitted will result in a report to Administration as a violation of academic integrity and code of honesty.
5. A pre-lab assignment is due at the start of the lab lecture and will be collected at that time. A student may not participate in the lab if the pre-lab assignment was not submitted on its due date. Pre-lab assignments contribute 20% (30/150) of the point score above.
6. The lab report is due at the start of the following week's lab lecture (typically, 1 week after the lab) unless an alternative date is determined by the instructor. Late lab reports will not be graded. Lab reports (individually weighted) contribute 70% (105/150) of the point score above.
7. There will be no (zero) make-up labs. Time and facilities will not permit rescheduling of labs for students in this course. Students must attend each lab lecture in order to participate in each lab.
8. One lab report representing the student's lowest score of an attended lab (or to be applied to one missed lab) will be dropped. A second missed lab will be scored as "0" points. If three (3) or more labs are missed (not attended) a grade of 'F' will result in the course. It is thus highly recommended to attend and complete all lab sessions and not risk a non-passing grade.
9. Competent lab technique, safety compliance, self-sufficiency, teamwork and housekeeping will be monitored and will contribute 10% (15/150) of the point score above.
10. Adherence to proper lab safety, instructor directives and lab cleanliness/housekeeping are critical. Improper attention to these requirements and practices can result in a drop from the course.

Two (2) Lecture Midterm Exams and Two (2) Lecture Quizzes:

1. The dates of the lecture midterm exams and quizzes are defined in the Schedule.
2. Exam and quiz grades will not be dropped and need to be taken on their scheduled dates.
3. If a midterm exam or a quiz is missed due to emergency medical situation or related and is physician documented, the score on the subsequent midterm or quiz will be counted double and represent both scores. There is no accommodation if a second midterm exam or quiz is missed; the score will be a '0'.
4. There are no extra credit projects or activities that are part of this course and thus there is no point contribution of any such activity in lieu of or in addition to any exams or quizzes.

Final Exam:

1. The Final exam will cumulatively assess the student's ability to be conversant in the course content and familiarity with the topics that are covered in the lectures and laboratory.
2. The Final exam cannot be rescheduled, dropped from the total course grade or substituted.
3. The Final exam will be given on March 27, 2018 at 4:00PM – 6:00PM in the lecture room.

SCHEDULE CHEM12A Winter 2018 Chad Miller (Lecture/lab content subject to change)

Week	Day/Date	Lecture Content (Tuesday & Thursday)	Lab Content (M/W & T/Th lab sections)	Exam Dates
1	Tues 1/09	Syllabus. CH1: Lewis structures, bond energy, orbitals, σ,π bonds, geometry	Check-in & Safety Orientation	
1	Thur 1/11	CH2: bond-line structures, delocalization, resonance stabilization	Lab1: Base & Acid Extraction Part B (2.21) Theory: 155-163; Procedure 163-168	
2	Tues 1/16	CH3: Acidity trends, influences on pK, equilibrium, solvation, practical reactions	Lab1: Base and Acid Extraction Part C (2.9, 2.10, 2.29)	
2	Thur 1/18	CH3/CH4: Acidity trends cont'd; Alkanes, nomenclature, properties, structures	Lab1: Recrystallization (2.17, 2.19) Theory: 91-99; Procedure: 99-104	
3	Tues 1/23	Quiz 1; CH4: Conformational analysis of acyclic alkanes, torsional energy diagrams	Lab1: Melting Point (2.7-2.8) Theory: 111-115; Procedure: 115-117	Lec QUIZ 1
3	Thur 1/25	CH4: Conformational analysis of mono- & di-substituted cyclohexanes, diaxial & diequatorial interactions, use of models	Lab2: Thin-layer chromatography: Plate prep (2.5-2.6, 2.21) Spinach and analgesics Theory: 179-184; Procedure: 185-186,188	
4	Tues 1/30	CH4: Evaluation of relative isomer stability using conformational analysis, examples	Lab Quiz 1; Lab2: Thin-layer chromatography: Plate development (2.23-2.24)	Lab QUIZ 1
4	Thur 2/01	CH5: Stereochemistry, chirality, optical activity R/S absolute configurations, enantiomers, diastereomers, meso forms	Lab3: Synthesis of 2-chloro-2-methylbutane (2.10, 2.13, 2.21) Synthesis Theory: 471-473; Procedure: 473-474	
5	Tues 2/06	CH5: symmetry, chiral resolution, Fischer projections	Lab3: Synthesis of 2-chloro-2-methylbutane Distillation (2.13)	
5	Thur 2/08	Midterm 1	Lab3: Synthesis of 2-chloro-2-methylbutane IR Spectroscopy Theory 235-258	MIDTERM 1
6	Tues 2/13	CH6: Chemical thermodynamics, kinetics, transition states, Hammond postulate	Lab3: (Continued) Synthesis of 2-chloro-2-methylbutane IR Spectroscopy	
6	Thur 2/15	CH6: Curved arrow formalism, mechanisms, reversibility CH10: Radical reactions of alkanes, mechanisms, rates & selectivity	Lab Quiz 2; Introduction to NMR Theory: 258-283 (Klein text book CH15 useful as an overview)	Lab QUIZ 2
7	Tues 2/20	Quiz 2; CH10: Hammond postulate, oxidation, allylic halogenation	Lab4: Dehydration of 4-methyl-2-pentanol synthesis (2.18) Theory: 342-346 Procedure: 346-347	Lec QUIZ 2
7	Thur 2/22	CH7: Nucleophiles, leaving groups, structural influences, solvents, charge stabilization, S_N2 and S_N1 mechanisms	Lab4: Dehydration of 4-methyl-2-pentanol Gas chromatography Theory: 196-206 (IR/NMR)	
8	Tues 2/27	CH7: S_N2 and S_N1 stereochemistry, stereospecificity, S_N2 vs S_N1, carbocation rearrangements, competing eliminations	Lab4: (Continued) Dehydration of 4-methyl-2-pentanol Gas chromatography (IR/NMR)	
8	Thur 3/01	CH7: E2 & E1 mechanisms (KIE), structural influences, stereoselectivity, regioselectivity, Zaitsev vs Hofmann	IR/NMR Spectroscopy problem solving	
9	Tues 3/06	Midterm 2	Lab5: Relative reactivity of alkyl halides	MIDTERM 2
9	Thur 3/08	CH7: Substitution/elimination reactions, synthesis, H & alkyl shifts of intermediates CH8: Alkenes, properties, isomers	Lab6: Bromination of (E)-stilbene: Synthesis (2.25-2.28) Theory: 358-362 Procedure: 372-375	
10	Tues 3/13	CH8: Addition step-wise mechanisms, regioselectivity, Markovnikov, intermediates, reversibility	Lab6: Bromination of (E)-stilbene: NMR Theory: 258-294	
10	Thur 3/15	CH8: Hydration, halogenation, hydrohalogenation, hydrogenation	Lab6: Bromination of (E)-stilbene: NMR	
11	Tues 3/20	CH8: Oxidations, epoxidation, ozonolysis, oxymercuration, hydroboration, catalysts	Lab Exam	LAB EXAM
11	Thur 3/22	Course review and group study session	Drawer check-out	
12	Tues 3/27	Final Exam 4:00PM – 6:00PM		FINAL EXAM

CHEM 12A SUCCESSFUL LEARNING PRACTICES

Organic chemistry has an historical reputation for being especially challenging for students and the following practices can help you get into a mind frame and study practices to succeed.

Our class necessarily will cover the course content at a rapid pace and requires a focused attention, the implementation of a conducive and comfortable study environment at home or on campus, consistent study practices and an individual resolve and motivation to achieve success.

This is a sophomore-level course with the expectation that students already developed an awareness of how to manage academic challenges when taking light or heavy STEM loads. A good-natured attitude combined with motivation certainly helps keep students on track.

Come to all lectures and labs. This is one of the most important recommendations I can provide. There is a lot of learning actually done during lectures and labs and the best way to learn and keep up with the class is to begin on day 1 of the course and attend all classes and labs.

1. Read text book chapters and review lecture presentation materials in advance of class.
2. Participate in class discussions and problem solving sessions.
3. Ask questions in class to gain clarification and a correct understanding.
4. Prepare for all labs by reading the lab text references in advance of the labs.
5. Identify and establish and maintain a compatible study environment free of distractions
6. If helpful, and it is my recommendation, study with class mates to supplement private study.
7. Learn the material as it is presented and do not accumulate unread chapters or content.
8. Do not attempt to study too much material at any one point.
9. Do not cram before exams – pace your study and problem solving at the class tempo.
10. Try to maintain a healthy lifestyle to facilitate learning and balance school, work and life.

Student Learning Outcome(s):

*Predict the product of a chemical reaction.

*Apply principles of thermodynamics, kinetics, and equilibrium to organic reaction systems.

*Generate logical stepwise reaction mechanisms.

*Construct molecular structure from spectroscopic data.