

**GENERAL INFORMATION****CHEMISTRY12A (CHEMD012A.35) CRN32209 Winter 2022****Instructor: Chad Miller E-mail: millerchad@fhda.edu**

<b>Lecture</b>	<b>Tuesday &amp; Thursday</b>	<b>3:30PM – 4:45PM</b>	<b>Room S32</b>
<b>Lab</b>	<b>Tuesday &amp; Thursday</b>	<b>11:30AM – 2:20PM</b>	<b>Room SC2210</b>
<b>Office hours</b>	<b>Tuesday &amp; Thursday</b>	<b>4:45PM – 5:45PM</b>	<b>Room S32</b>

**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, ISBN: 978-1-119-31615-2 Klein, David. *Organic Chemistry, 3<sup>rd</sup> edition*, John Wiley & Sons: New Jersey, 2017. (Wiley publisher site for eBook options: (Copy link and paste in browser) <https://www.wiley.com/en-us/Organic+Chemistry%2C+EPUB+with+Enhanced+Student+Solutions+Manual+and+Study+Guide%2C+3rd+Edition-p-9781119351603> and De Anza bookstore: <https://www.deanza.edu/bookstore/> or other outlets)
- ✓ **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) will be provided in addition to lab gloves.
- ✓ **Carbonless copy Lab notebook:** 100 page carbonless copy spiral bound notebook. ISBN: 1429224541
- ✓ **Standard combination 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

**Important Dates: Please note the following dates**

- ☑ **Jan 4:** *Attend 1/04 lecture and 1<sup>st</sup> lab meeting to maintain your registration in this course.*
- ☑ **Feb 25:** *Deadline to drop a 12-week class with a grade of 'W'*
- ☑ **Mar 22:** *Final Exam date. 4:00PM – 6:00PM*

**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/student-services/> to learn more.

- **De Anza College Winter quarter guide:** <https://www.deanza.edu/quarter-guide/>
- **Student Success Center:** <http://www.deanza.edu/student-success/> 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.

SCHEDULE CHEM12A Winter 2022 Chad Miller (Lecture/lab content & dates subject to change)

Week	Day/Date	Lecture Content (Tuesday & Thursday)	Weekly Lab Content (Tuesday & Thursday)	Exam Dates
1	Tues 1/04	Syllabus. CH1: Lewis structures, bond energy, orbitals, $\sigma$ , $\pi$ bonds, geometry	Check-in & Safety Orientation	
	Thur 1/06	CH2: bond-line structures, delocalization, resonance stabilization	Additional laboratory protocols	
2	Tues 1/11	CH3: Acidity trends, influences on pK, equilibrium, solvation, practical reactions	Lab1: Base & Acid Extraction Part B (2.21) Theory: 155-163; Procedure 163-168	
	Thur 1/13	CH3/CH4: Acidity trends cont'd; Alkanes, nomenclature, properties, structures	Lab1: Base and Acid Extraction Part C (2.9, 2.10, 2.29)	
3	Tues 1/18	CH4: Conformational analysis of acyclic alkanes, torsional energy diagrams	<b>Quiz 1 given in lab</b> Lab1: Recrystallization (2.17, 2.19) Theory: 91-99; Procedure: 99-104	<b>Lec QUIZ 1</b>
	Thur 1/20	CH4: Conformational analysis of mono- & di-substituted cyclohexanes, diaxial & diequatorial interactions, use of models	Lab1: Melting Point (2.7-2.8) Theory: 111-115; Procedure: 115-117	
4	Tues 1/25	CH4: Evaluation of relative isomer stability using conformational analysis, examples	<b>Lab Quiz 1</b> ; Lab2: Thin-layer chromatography: Plate prep (2.5-2.6, 2.21) Spinach. Theory: 179-184; Procedure: 185-186,188	<b>Lab QUIZ 1</b>
	Thur 1/27	CH5: Stereochemistry, chirality, optical activity, R/S absolute configurations, enantiomers, diastereomers, meso forms	Lab2: Thin-layer chromatography: Plate development (2.23-2.24)	
5	Tues 2/01	CH5: symmetry, chiral resolution, Fischer projections	Introduction to IR spectroscopy: CH14 in Klein; Lab text 238-258 (8.2)	
	Thur 2/03	IR spectroscopy: spectra interpretation	<b>Midterm 1 given in lab</b>	<b>MIDTERM 1</b>
6	Tues 2/08	CH6: Chemical thermodynamics, kinetics, transition states, Hammond postulate	IR spectroscopy: spectra interpretation	
	Thur 2/10	CH6: Curved arrow formalism, mechanisms, reversibility CH10: Radical reactions of alkanes, mechanisms, rates & selectivity	<b>Lab Quiz 2</b> Introduction to NMR spectroscopy: CH15 in Klein; Lab text 258-283 (8.3)	<b>Lab QUIZ 2</b>
7	Tues 2/15	CH10: Hammond postulate, oxidation, allylic halogenation	<b>Quiz 2 given in lab</b> NMR spectroscopy: spectra interpretation	<b>Lec QUIZ 2</b>
	Thur 2/17	CH7: Nucleophiles, leaving groups, structural influences, solvents, charge stabilization, $S_N2$ and $S_N1$ mechanisms	NMR spectroscopy: spectra interpretation;	
8	Tues 2/22	CH7: $S_N2$ and $S_N1$ stereochemistry, stereospecificity, $S_N2$ vs $S_N1$ , carbocation rearrangements, competing eliminations	Lab3: Dehydration of 4-methyl-2-pentanol Theory: 342-346 Procedure: 346-347	
	Thur 2/24	CH7: E2 & E1 mechanisms (KIE), structural influences, stereoselectivity, regioselectivity, Zaitsev vs Hofmann	Lab3: Dehydration of 4-methyl-2-pentanol Gas chromatography Theory: 196-206	
9	Tues 3/01	CH7: Reactions, synthesis, H & alkyl shifts of intermediates; CH8: Alkenes	<b>Midterm 2 given in lab</b>	<b>MIDTERM 2</b>
	Thur 3/03	CH8: Alkenes, addition reactions, hydrohalogenation, halogenation, radicals	NMR/IR combined spectroscopy	
10	Tues 3/08	CH8: mechanisms, regioselectivity, Markovnikov, intermediates, reversibility	Lab4: Bromination of (E)-stilbene: Synthesis (2.25-2.28) Theory: 358-362 Procedure: 372-375	
	Thur 3/10	CH8: Oxidations, epoxidation, ozonolysis, oxymercuration, hydroboration, catalysts	Lab4: Bromination of (E)-stilbene: NMR Theory: 258-294	
11	Tues 3/15	CH8: reactions and syntheses, problem sets	<b>Lab Exam</b>	<b>LAB EXAM</b>
	Thur 3/17	Course review	Drawer check-out	
12	Tues 3/22	<b>Final Exam 4:00PM – 6:00PM</b>		<b>FINAL EXAM</b>

GRADING POLICY CHEM12A Chad Miller Winter 2022

Assessment	Points Each	Total Points	Percent of Total
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%
<b>Total Points</b>		<b>1,000</b>	<b>100%</b>

Grade	% of Total Points	Grade	Percent 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			

**NOTE:** In an event that requires lab activities to migrate to remote instruction (synchronous Zoom lab meetings), alternative lab content and assignments will be used to substitute for pre-labs and lab reports.

**Lab Assessments:**

- 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.
- All submitted written work for 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. Per instruction, 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 honesty.
- A pre-lab assignment is due at the start of the lab meeting. The pre-lab will be marked as complete or incomplete. A student may not participate in the lab if the pre-lab assignment was not submitted on its due date and time and marked as complete. Pre-labs contribute 20% (30points/150points) to the total lab score.
- The lab report is typically due before the start of the following week's lab lecture, unless an alternative date is determined by the instructor. Late lab reports will not be graded. Lab reports (individually weighted) contribute 70% (105points/150points) to the total lab score. Lab reports will be submitted on Canvas as PDF documents.
- 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.
- If a lab is missed and excused by the instructor, a lab partner data set will be provided. A second missed lab will be scored as "0" points unless excused by physician documentation. If three (3) or more labs are missed (not attended/no instructor approval) a score of '0' points will be given to the total lab score.
- Competent lab technique, safety compliance, self-sufficiency, teamwork and housekeeping will be monitored and will contribute 10% (15points/150points) to the total lab point score.
- 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:**

- The dates of the lecture midterm exams and quizzes are defined in the Schedule.
- Midterm and quiz grades will not be dropped and need to be taken on their scheduled dates and times.
- Midterm exam grades will not be dropped. An unexcused missed midterm exam will have a point score of '0/150' points. In the event a student submits a physician letter, or otherwise instructor approved documented reason for an absence resulting in missing one midterm exam, then the Final exam will be weighted as 40% of the total grade (15% + 25%). The Final exam score will not compensate in any manner or be adjusted for two missed midterm exams. There are no make-up lecture quizzes.
- There are no extra credit projects or activities that are scheduled for this course. The instructor retains the option of providing an unplanned exercise owing to extenuating circumstances or events.

**Final Exam:**

- The Final exam will assess the student's ability to understand the topics, principles and applications that are covered in the course.
- The Final exam cannot be rescheduled, dropped from the total course grade or substituted.

**De Anza College Chemistry Department**  
**Safety Procedures for In-Person Labs Offered During the Winter 2022 Quarter**

**Guiding Principles**

The chemistry department faculty are committed to offering in-person labs in a manner that minimizes the risk of spread and infection of COVID-19. We will apply best practices, including PPE and social distancing, to facilitate a safe and healthy laboratory environment.

**Essential College Materials**

The college is providing sterilizing wipes, gloves (non-latex), and extra masks (3-ply blown-melt center) for students, faculty, and staff currently. These can be found in all lab rooms.

The fume hoods must be operating properly to provide sufficient ventilation for the laboratory rooms. In the case of malfunctioning or inoperable ventilation, class activities will be canceled.

**Personal Protective Equipment and Hygiene**

**Every student, faculty, and staff who enters a lab during the winter 2022 quarter must wear a mask that fully covers the nose and mouth.** This is a department policy for the entirety of Winter Quarter.

- 1. Students who do not comply with the mask policy will be asked to leave the building. If a student refuses to wear their mask and will not leave, this constitutes disruptive behavior and should be reported to the PSME dean.**
- 2. Students, faculty, and staff must wear disposable gloves (preferably nitrile, provided) when handling glassware, chemicals, and equipment.**
- 3. Students, faculty, and staff are also expected to wear department-approved goggles (Indirect Vent, Z87), closed-toed shoes, and long pants or skirt.**
- 4. Students will be provided with a pair of goggles, which will remain in their locker when not in use.**
- 5. Students should wipe down their work area with a sterilizing wipe (provided) (e.g. isopropyl alcohol or bleach) at the beginning and end of each class.**
- 6. Extra gloves and masks will be kept behind the whiteboards or near the instructor station.**

**Exposure Notifications and Contact Tracing**

The chemistry department will follow all county and campus policies with regards to exposure notifications and contact tracing. The campus policy can be found here:

[COVID-19 Response Team](https://hr.fhda.edu/downloads/COVID%20Response%20Team%20CRT.pdf) ([https://hr.fhda.edu/ downloads/COVID Response Team CRT.pdf](https://hr.fhda.edu/downloads/COVID Response Team CRT.pdf))

**Summary of response plan:**

De Anza has recently stopped using OptimumHQ health reporting application.

- 1. In its place, students, faculty, and staff will perform a self-health check using posted guides outside the lab room prior to entering the lab room.**
- 2. These steps can also be conducted at home prior to arrival.**
- 3. Students should not enter the lab room prior to the start of their lab period and not before their instructor is present.**
- 4. In the event that the self-check raises any concerns, that individual should not attend class that day.**
- 5. Students are not permitted to attend lab if they are ill (Flu, cold, or Covid symptoms).**
- 6. In accordance with District policy they will be considered presumptively contagious irrespective of whether the person actually has COVID-19.**
- 7. Any student who comes to lab and appears symptomatic for COVID-19 or the flu should be sent to Student Health Services (Hinson Campus Center, Lower Level).**

**De Anza College Chemistry Department**  
**Safety Procedures for In-Person Labs Offered During the Winter 2022 Quarter**

(Continued)

**Building and room access**

1. Students should enter the labs through the exterior doors only.
2. The door that opens into the stockroom area / lobby should not be used by students and they will not be able to reenter the lab through that door.
3. Students will not check out equipment (including goggles) from the stockroom due to congestion concerns.
4. Common glassware will be provided for each lab, and faculty should ensure that students clean their glassware before returning it.
5. Students not in lab on a given day due to health reasons will have an alternative assignment that they can complete at no penalty.
6. Based on the increased air flow and hood arrangements, labs held in SC2210 will meet with up to 26 students at each meeting.
7. Students in room 2210 will have access to a balance room. No more than 5 students should be in the room at a time, and students must remain masked.
8. Students should start cleaning up and storing items 30 minutes before the end of class to ensure a timely departure.
9. All students should *leave the lab room* promptly at the end of class (typically 20 minutes after the hour).

[The following laboratory safety and housekeeping guidelines are excerpted from the Chem12 syllabus of Professor Erik Woodbury, De Anza College.]

### Rules for Safe and Efficient Chemistry Laboratory Operations

#### Safety Rules:

1. **Prepare for each experiment by reading all of the directions before lab starts.**
2. **Locate the Safety Equipment.** Know the locations of the eye wash, safety shower, fire extinguishers, fire blankets, first aid kit, fume hoods, telephone and all exits that are to be used in an emergency. Your laboratory instructor will describe the use of the safety equipment.
3. **Protect your eyes.** Wear approved eye protection at all times. Your laboratory instructor will inform you which of these you must have. Goggles provide maximum safety. Prescription glasses, if you need them, must be worn under approved eye protection. Contact lenses should not be worn in the laboratory because fumes may accumulate under the lenses and injure your eyes and the lenses make it difficult to flush chemicals from your eyes.
4. **Tie long hair back.** This precaution will keep your hair out of burner flames and harmful chemicals.
5. **Do not wear clothing with loose, flowing sleeves.** This precaution will keep your sleeves out of burner flames and harmful chemicals.
6. **Wear shoes that cover all of your feet.** Broken glass on the laboratory floor and spilled chemical reagents are all too common. Shoes that cover your feet completely will protect them from broken glass and chemical splashes. The best types of shoes are closed-toe made out of leather.
7. **Wear clothes that cover your torso and your legs to the knees.** Clothing will give your body needed protection. Good clothing can be protected with a lab apron or coat.
8. **Do not eat or drink in the laboratory.**
9. **Do not taste any chemical reagent.**
10. **Do not smell chemical reagents directly.** When you are instructed to smell a chemical, do so by gently wafting the vapors toward your face. Do not inhale deeply.
11. **Do not pipette solutions by mouth.** Use a rubber suction bulb to fill the pipette.
12. **Do not work with flammable liquids near a flame.**
13. **Do not engage in games or horseplay in the laboratory.** Never run in the laboratory.
14. **Do not attempt unauthorized experiments in the laboratory.**
15. **Do not work in the laboratory in the absence of your instructor or authorized representative.**
16. **Use a fume hood when required.**
17. **Handle glass tubing and thermometers carefully.** When inserting glass tubing or thermometers through a rubber stopper, always hold the glass close to the stopper and use a lubricant such as glycerin to help the glass slide through the stopper. Do not continue to try to force glass through a stubborn stopper, get a new stopper and/or get help. When inserting a pipette into a pipette bulb, hold the pipette near the bulb and GENTLY insert the pipette.
18. **When diluting, never pour water into concentrated reagents.** Always pour the reagent into the water.
19. **If you spill a chemical reagent on yourself, immediately flood the exposed area with water and then summon the laboratory instructor. Inform the instructor immediately about any other accidents or spills.**
20. **Be aware of your neighbors. Are they obeying the safety rules?** A neighbor's accident may injure you.
21. **Avoid touching your face and rubbing your eyes while in the laboratory.** If you must do so, first wash your hands.
22. **Wash your hands before leaving the laboratory.**
23. **Never heat a closed container.** Pressure build up can cause the container to explode.
24. **Assume any chemical is hazardous if you are unsure.**
25. **Do not violate any other safety rule issued by your laboratory instructor.**

## Rules for Safe and Efficient Chemistry Laboratory Operations

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### Housekeeping Rules:

1. **Clean up broken glass immediately with a broom and dustpan. Do not use your hands.** Dispose of broken glass in the special container that is provided, never in a regular trash can.
2. **Chemical spills must be cleaned up immediately.** Immediately notify your instructor who will advise you how to clean it up and/or assist you. Dispose of the collected contaminated chemical properly as instructed.
3. **Do not pour any chemical down into the sink or in the trash without authorization.** Clearly labeled disposal bottles will be provided when needed.
4. **Take containers to the stock of chemical reagents.** Do not bring stock chemicals to your laboratory bench.
5. **Read the label on a reagent bottle carefully.** Is it the correct chemical? Is it the correct concentration?
6. **Do not insert your own pipette, medicine dropper or spatula into a stock bottle.**
7. **Use special care with stoppers or tops of stock bottles.** Do not allow them to pick up contamination. Your instructor will provide additional instructions for handling the stoppers or tops found in your laboratory.
8. **Always replace the stopper or top of a stock bottle when you are finished taking some of the reagent.** Make sure that you put the stopper or top back onto the correct bottle.
9. **When pouring liquid from bottles, hold the bottle with the label against the palm of your hand so that the liquid is poured from the side opposite the label.** If any liquid runs down the outside of the label, immediately wipe off the liquid.
10. **Do not take any more of a reagent than is required.** Many of the chemicals used in the laboratory, including deionized water, are costly.
11. **Never return any unused reagent to a stock bottle.** If you take too much of a chemical, dispose of it as directed by your instructor or offer it to a classmate who needs it.
12. **Set up your glassware and apparatus away from the edge of your laboratory bench.**
13. **Thoroughly clean the area around your laboratory bench and the top of your laboratory bench before leaving lab.**
14. **Keep shared areas of the laboratory clean.** This includes areas such as the balance room and where the stock bottles are stored. It is especially important to keep the balances clean and free of chemical spills.
15. **Keep your laboratory equipment clean.** Good results depend on clean equipment.
16. **If a piece of equipment containing mercury is broken, inform your laboratory instructor immediately.** Keep the area blocked off to avoid scattering the mercury.
17. **Follow any other housekeeping rules given by your laboratory instructor.**

From the American Chemical Society Safety in Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty members:

**1) Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins,** including when removing equipment from student drawers, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.

**2) Shoes that completely enclose the foot are to be worn at all times;** NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab.

## Rules for Safe and Efficient Chemistry Laboratory Operations

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- 3) Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: ankle-length clothing must be worn at all times
- 4) Hair reaching the top of the shoulders must be tied back securely
- 5) Loose clothing must be constrained
- 6) Wearing "...jewelry such as rings, bracelets, and wristwatches in the laboratory..." should be discouraged to prevent "...chemical seepage in between the jewelry and skin...."
- 7) Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture
- 8) Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.
- 9) Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.
- 10) Students are required to know the locations of the eyewash stations, emergency shower, and all exits
- 11) Students may not be in the lab without an instructor being present.
- 12) Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.
- 13) Except for soapy or clear rinse water from washing glassware, **NO CHEMICALS MAY BE Poured INTO THE SINKS**; all remaining chemicals from an experiment must be poured into the waste bottle provided.
- 14) Students are required to follow the De Anza College Code of Conduct at all times while in The lab: "horseplay", yelling, offensive language, or any behavior that could startle, frighten or harass another student is not allowed during lab.
- 15) Strongly recommended: Wear Nitrile gloves while performing lab work; wear a chemically-resistant lab coat or lab apron; wear shoes made of leather or polymeric leather substitute.



## 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 second-year course at De Anza College with the expectation that students already developed an awareness of how to manage academic challenges when taking either light or heavy STEM course loads. A dedicated attitude combined with motivation certainly helps keep students on track.

**Attend and participate in 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 one 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. **Keep current with the material 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 home.**

**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.