CHEMISTRY12C SYLLABUS

GENERAL INFORMATION

CHEMISTRY12C (CHEM D012C01) Summer 2025 Modality: In-person on-campus course

Instructor: Chad Miller E-mail: millerchad@fhda.edu

Lecture (CRN 00218)	**Tues Thur**	**11:30PM – 12:45PM**	**Room SC2210**
Lab (CRN 00218)	**Tues Thur**	**8:30AM – 11:20AM**	**Room SC2210**

Course Description: An exploration of the physical properties and chemical behavior of important classes of organic compounds, focusing on amines, carboxylic acids, and carboxylic acid derivatives, with an introduction to the chemistry of lipids, carbohydrates, and proteins. Emphasis on retrosynthesis, spectroscopic structure determination, and reaction mechanism. Laboratory experiments involving the multi-step synthesis of organic compounds and the characterization of those compounds using chromatography and infrared (IR) and nuclear magnetic resonance (NMR) spectroscopy. For chemistry majors or those in closely allied fields such as biochemistry and chemical engineering. A grade of C or better in Chemistry12B is a prerequisite.

Required Materials:

- ✓ **Textbook:** McMurry, Organic Chemistry, 10th ed, OpenStax https://openstax.org/details/books/organic-chemistry (PDF download)
- ✓ **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

- ☑ ***June 30: Attend 6/30 lecture and lab session in order to maintain registration in this course.***
- ☑ ***August 7*: Final Exam date. 11:30AM – 1:30PM (in classroom)**

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.

Any manner of dishonesty observed, detected or suspected will result in consequences that impact academic performance. Maintaining a bond of trust and confidence between student and instructor is vitally important.

It is your responsibility to recognize academic dishonesty: http://www.deanza.edu/studenthandbook/academic-integrity.html

NOTE: Copyright protection of instructor course materials: All materials developed and/or authored by this course instructor are **protected by United States copyright law** and **may not be distributed or sold** to any third parties including individuals who are not course-registered students, other individuals, companies, Web sites and content aggregators or any other party that has no valid or lawful right to possess such materials. Any such legal distribution of materials **requires in advance of distribution the written consent, including signature and date, of this instructor**. Any violation of this policy will result in appropriate legal action.

GENERAL INFORMATION
CHEMISTRY12C (CHEMD012C.01) Summer 2025
Instructor: Chad Miller E-mail: millerchad@fhda.edu

NOTE to transferring students: **This instructor is not responsible for student academic performance or the grade outcome** that might be committed by a student to a transfer school for the successful completion (a grade C or higher) of this course to meet transfer school admission requirements. It is the responsibility of the student to manage any and all course grades or attendance commitments made on their behalf to transfer schools.

Contact me: Students may arrange to meet me during my office hours for additional support on the course content. Students may also contact me outside of class and lab hours by email. I attempt to respond to email messages that I receive on class weekdays (Mondays through Thursdays) in a timely manner which might be that same day or the following day. Email messages that are sent on Fridays or weekends will likely be replied to early the following week.

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

- **De Anza College Winter quarter guide**: https://www.deanza.edu/quarter-guide/
- **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.

SCHEDULE CHEM12C Summer 2025 Chad Miller [Content subject to change]

Week	Day/Date	Lecture Content	Lab Content	Exam Dates
1	Mon 6/30	CH20: Carboxylic acids, reactivity, synthesis, esterification	Check-in, Safety orientation	
1	Tues 7/01	CH20: Carboxylic acid derivatives, interconversion, transformation	Lab1 Synthesis of benzocaine: Theory 759-765 Procedure 764-765	
1	Wed 7/02	CH20: Carboxylic acid derivatives synthesis and reactions	Lab1 Synthesis of benzocaine: Theory 759-765 Procedure 764-765	
1	Thur 7/03	CH20: Carboxylic acid derivatives synthesis and reactions	Lab1 Synthesis of benzocaine: Theory 759-765 Procedure 764-765	
2	Mon 7/07	CH21: Enols and enolates; kinetics, thermodynamics Enols and enolates; aldol condensations	Lab2 Aldol condensation: Theory 689-691 Procedure 691-692	
2	Tues 7/08	CH21: Enols and enolates; Claisen condensations, alkylation	Lecture Quiz Lab2 Aldol condensation: Theory 689-691 Procedure 691-692	LECTURE QUIZ
2	Wed 7/09	CH21: Enols and enolates, conjugate addition reactions; synthesis	Lab2 Aldol condensation: Theory 689-691 Procedure 691-692	
2	Thur 7/10	Group study Midterm 1	CH21: Enols and enolates, multistep synthesis	
3	Mon 7/14	CH22: Amines, basicity, reactivity, alkylation, elimination	Midterm 1	MIDTERM 1
3	Tues 7/15	CH22: Amines, Cope, diazonium ion, reductive amination, synthesis	Lab3 Robinson annulations: Theory 697-699 Procedure 700-702	
3	Wed 7/16	Heterocycles structure, reactivity, chemistry & pharmaceutical chemistry	Lab3 Robinson annulations: Theory 697-699 Procedure 700-702	
3	Thur 7/17	Drug synthesis	Lab3 Robinson annulations: Theory 697-699 Procedure 700-702	
4	Mon 7/21	CH24: Carbohydrates, structure, aldose, ketose modifications, chirality, reactivity	Lab activity: Survey of natural product synthesis	
4	Tues 7/22	CH25: Amino acids structure, chemistry, synthesis, protein structure	Lab activity: Survey of natural product synthesis	
4	Wed 7/23	Group study Midterm 2	CH25: Protein structure-function, hemoglobin	
4	Thur 7/24	CH25: Protein structure-function, chemistry of enzyme catalysis, serine proteases, enzyme inhibitors	Midterm 2	MIDTERM 2
5	Mon 7/28	Peptide & protein analysis, amino acid analysis and Edman sequencing	Lab4 Identify/characterize carbohydrates Theory 882-883 Procedure 883-886	
5	Tues 7/29	Modern methods of peptide synthesis	Methods of peptide & protein analysis, Edman sequencing	
5	Wed 7/30	Modern methods in oligonucleotide chemistry & DNA synthesis	Modern methods of peptide synthesis	
5	Thur 7/31	Methods review of peptide/protein sequencing, synthesis, DNA synthesis	Modern methods in oligonucleotide chemistry & DNA synthesis	
6	Mon 8/04	Chemistry of metabolic pathways	Lab Exam	Lab Exam
6	Tues 8/05	Course review	Lab check out	
6	Wed 8/06	Group study for final exam	Group study for final exam	
6	Thur 8/07	Final Exam		FINAL EXAM

GRADING POLICY CHEM12C Chad Miller Spring 2025

Assessment	Points	Total Points	Percent
Lab assignments; safety & technique	30/50	200	20%
Lab exam	100	100	10%
Lecture quiz	100	100	10%
Midterms	200	400	40%
Final exam	200	200	20%
Total		1,000	100%

Grade	% of Total Points	Grade	% of Total Points
A+	98% - 100%	B-	77% - 79%
A	90% - 97%	C+	74% -76%
A-	87% - 89%	C	65% - 73%
B+	84% - 86%	D	55% - 64%
B	80% - 83%	F	<55%
% of total points determines the letter grade			

Lab Assessments:

1. 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 a lab report/assignment.**
2. The format and content of pre-lab assignments and lab reports/assignments will be described during the first lab meeting**.**
3. **All submitted written work for the lab (i.e., pre-labs, lab reports/assignments) must be of the student's original authorship.** Per instruction, students may share experimental data, however all lab reports & assignments 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 or assignments that are submitted will result in a report to Administration as a violation of academic integrity and code of honesty.**
4. **A pre-lab is due at the start of the lab meeting.** The pre-lab will be marked as complete or incomplete; it is not scored. A student may not participate in the lab if a proper pre-lab was not submitted on its due date and time and marked as complete.
5. The lab report or assignment is typically due one week following the completion of the lab unless an alternative date is determined by the instructor. Late lab reports or assignments will not be graded.
6. **There will be no (zero) make-up labs.** Time and facilities will not permit rescheduling of labs for students in this course. Students need to attend each lab lecture in order to participate in each lab.
7. 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.
8. **One lab exam will be given and will account for 10% of the course point total.**
9. **Safety compliance, competent lab technique, self-sufficiency, teamwork and housekeeping will be monitored and will account for 50 lab points.**
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 One (1) Lecture Quiz:

1. **The dates of the lecture midterm exams and quiz are defined in the Schedule.**
2. **Midterm and quiz grades will not be dropped and need to be taken on scheduled dates and times.**
1. **Midterm exam grades will not be dropped. An unexcused missed midterm exam will have a point score of '0/150' points. If a midterm exam is missed due to an emergency medical situation or family emergency and proper documentation is provided to the instructor, the score on the two remaining midterms will be averaged and then applied to the missed exam score. There is no accommodation if two midterm exams are missed; the score on each will be a '0'.**
2. **There is no make-up lecture quiz.**
3. **There are no extra credit projects or activities that are scheduled for this course.**

Final Exam:

1. **The Final Exam will assess the student's ability to understand and apply the correct skills to problem solving based on the cumulative knowledge gained from learning the course content.**
2. **The Final exam cannot be rescheduled, dropped from the total course grade or substituted.**

Chemistry Department lab safety guidelines

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:

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 obtaining equipment from the stockroom or 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
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 medical conditions 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 lab: “horseplay”, yelling, offensive language, or any behavior that could startle or frighten 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.

All students must sign and date the safety contract form available on Canvas in order to participate in laboratory activities.

Our Chemistry 12C course content demands attendance and consistently focused attention, the implementation of a conducive study environment, effective study practices and an individual resolve and motivation to achieve success.

This is the third quarter of a one-year sequence of organic chemistry 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 genuine motivation and time-management skills certainly help keep students on track.

Attend all lectures and labs. This is one of the most important recommendations I can provide. There is a significant amount learning that takes place during each class lecture and in each lab and the optimal way to learn and keep current with the stream of content is to attend and participate in all learning activities in class and individual and team activities in the labs.

The grading policy reflects the need to maintain attendance and the requirement to plan ahead to be present for all quizzes, exams, labs and the final exam.

Key Success Factors:

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

Student Learning Outcome(s):

• Apply the principles of thermodynamics, kinetics, equilibrium to biologically important molecules.

• Conduct spectroscopic analysis and identifiy structures of biologically important molecules.

• Generate stepwise reaction mechanisms of biologically important molecules.

• Design logical syntheses and structural modifications of biologically important molecules.

Office Hours: