

CHEMISTRY12C SYLLABUS

GENERAL INFORMATION

CHEMISTRY12C (CHEMD012C30Z) Spring 2021

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

Lecture (CRN46823)	Monday Wednesday	6:30PM – 7:20PM	Online Zoom
Lab	Monday Wednesday	7:30PM – 10:20PM	Online Zoom
Office Hours	Friday	9:30AM – 11:30AM	Online Zoom

<https://deanza.edu/online-ed/students/remotereading.html> Student resource hub for Canvas and Zoom

Course Description: 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:

- ✓ **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)
- ✓ **Computer or laptop capable of using Zoom meetings with audio, video and chat; Canvas; viewing Web content and videos such as YouTube; E-mail** which will be the modes of remote instruction this quarter. Note that all lectures will be conducted using Zoom meeting software. Lab meetings will be conducted using Zoom meeting software on the days and times indicated. The lab Zoom sessions may vary in terms of start and end times and the instructor will provide details and advance notice. Office hours will be provided using Zoom meeting software.

Recommended:

- ✓ Molecular model kit for organic chemistry – many options available
- ✓ *Pushing Electrons, 4e*. Daniel P. Weeks

Important Dates: Please note the following dates

- ☑ **April 5: Attend the 1st lecture and lab session in order to maintain registration in this course.**
- ☑ **June 23: Final Exam date**

Online classroom courtesy: We want to achieve the highest level of learning experience in lecture and in lab and to accomplish that please refrain from using audio and video unless permitted by the instructor. All online interactions including audio, video and chat need to pertain to the course material or have relevance as determined by the instructor. Only registered students, authenticated by their name and email address, can participate in Zoom lecture and lab sessions. Students who engage in disruptive conduct will be removed from the Zoom meeting session and may be dropped from the course. Recording class 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.

- **Student Success Center:** <http://www.deanza.edu/student-success/>
- **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 can be reached at 408.864.8753.

GRADING POLICY CHEM12C Chad Miller Spring 2021

Assessment	Points	Total Points	Percent
Midterms (3)	200	600	60%
Final exam	200	200	20%
Lab exam	50	50	5%
Lab assignments	varied	100	10%
Synthesis project	50	50	5%
Total		1,000	100%

Grade	% of Total Points	Grade	% of Total Points
A+	95% - 100%	B-	77% - 79%
A	90% - 94%	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:

- Competency in experimental principles will be assessed by lab assignments and a Lab exam.
- Laboratory experience is an essential component of this course and the content will be delivered online as a remote learning experience.
- Attendance at the first online lab meeting is a requirement to remain registered in this course.
- All submitted assignments related to the lab must be of the student's original authorship. 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 assignments or activities that are submitted by a student that is the original work of a fellow student will result in a report to Administration as a violation of academic integrity and code of honesty.
- Lab assignments will vary in content, format and point allocation. The instructor will provide details as they pertain to the individual lab assignments.
- Lab assignments will be due on scheduled dates. There will be no (zero) make-up lab assignments.
- If two (2) or more online lab meetings are missed (not attended) a total point score of zero (0) will be assigned to the lab portion of this course. It is thus highly recommended to attend all lab sessions and not risk a non-passing grade.
- One lab exam is given pertaining to the lab content and the date is defined in the Schedule.

Three (3) Midterm Exams:

- The dates of the lecture midterm exams are defined in the Schedule.
- Scores will not be dropped and midterms need to be taken on their scheduled dates.
- If one midterm exam is missed due to an emergency medical situation and is physician documented, the average of the two remaining midterm scores will be applied to the missed exam score. There is no make-up exam. There is no accommodation if a second midterm exam is missed; the score will be a '0'.

Final Exam:

- 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.
- The Final exam cannot be rescheduled, dropped from the total course grade or substituted.
- The Final exam date is defined in the Schedule.

The handling of course materials and their distribution:

This course is taught as a remote instruction class using online technologies. All course materials, including all content that is delivered to students via Canvas or E-mail in Microsoft Word format, Adobe PDF format, jpeg or other picture file formats, media format or printed materials are under private copyright. The course content is solely intended for use by registered students in this class and no other parties or companies can be given access to it. The content will not be published for general access on the public Internet. The result of copyright infringement is a legal matter.

LECTURE & LAB SCHEDULE CHEM12C Spring 2021 Chad Miller [Content subject to change; Klein 3rd Ed Chapters]

Week	Day/Date	Lecture Content	Lab Content	Exam Dates
1	Mon 4/5	Course overview; syllabus; CH20: Carboxylic acids, reactivity, synthesis, esterification	(Lecture continued) Carboxylic acid derivatives, interconversion, transformation	
1	Wed 4/7	CH21: Enols and enolates: kinetics, thermodynamics, aldol condensations	Lab1 Synthesis of benzocaine: Theory 759-765 Procedure 764-765	
2	Mon 4/12	CH21: Enols and enolates: Aldol/Claisen condensations, alkylation, annulations	Lab2 Aldol condensation: Theory 689-691 Procedure 691-692	
2	Wed 4/14	CH21: Enols and enolates: conjugate addition reactions, multistep synthesis	(Lecture continued) CH21: Enols and enolates; examples and problem sets	
3	Mon 4/19	CH21: Enols and enolates; examples and problem sets	Midterm 1 group study	
3	Wed 4/21	Midterm 1		Midterm 1
4	Mon 4/26	CH22: Amines: reactivity, alkylation, Cope elimination, reductive amination	Robinson annulations: Journal article Lab3 Robinson annulations: Theory 697-699 Procedure 700-702 Synthesis Project: Background, selected syntheses, presentation schedule	
4	Wed 4/28	Heterocycles: structure, aromatic substitutions; indole synthesis; natural product synthesis	Lab4 Sulfanilamide, part B Theory 796-803 Procedure 805-806, parts C&D Theory 796-803 Procedure 806-808 part E Theory 796-803 Procedure 809-810	
5	Mon 5/03	Pharmaceutical chemistry: key reactions and syntheses of market-leading drugs	Synthesis Project collaborative preparation 1	
5	Wed 5/05	Synthesis in pharmaceutical chemistry	Midterm 2 group study	
6	Mon 5/10	Midterm 2		Midterm 2
6	Wed 5/12	CH24: Carbohydrates: structure, aldose and ketose modifications, chirality, reactivity	Synthesis Project collaborative preparation 2 Lab5 Identify/characterize carbohydrates Theory 882-883 Procedure 883-886	
7	Mon 5/17	CH25: Amino acids: chemical structure, classification, electrophoresis, synthesis, peptide bond formation	(Lecture continued) Protein structure: primary, secondary, tertiary, quaternary; relationship to function	
7	Wed 5/19	Interpreting protein primary structure and implications to pathology, hemoglobin case study	(Lecture continued) Chemistry of enzyme catalysis: active sites, mechanisms, serine proteases	
8	Mon 5/24	Chemistry of enzyme inhibitors and drug targets	Midterm 3 group study	
8	Wed 5/26	Midterm 3		Midterm 3
9	Mon 5/31	Memorial Day Holiday		
9	Wed 6/02	Chemical methods of peptide/protein sequencing, Edman chemistry	Experimental methods in peptide and protein sequencing	
10	Mon 6/07	Modern methods in peptide synthesis: liquid-phase, solid-phase, coupling, cleavage, protecting groups	Lab Exam is available (Lecture continued) peptide synthesis, coupling, cleavage, protecting groups	
10	Wed 6/09	Modern methods in oligonucleotide chemistry & DNA synthesis	Methods review of peptide/protein sequencing, synthesis, DNA synthesis	
11	Mon 6/14	Synthesis Presentations Gala Evening		
11	Wed 6/16	CH26: Lipids and biomembrane chemistry; Organic chemistry of metabolic pathways	Lab exam due Final exam group study	Lab Exam Due
12	Wed 6/23	Final Exam		Final Exam

CHEM 12C SPRING 2021 SUCCESSFUL STUDY PRACTICES

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 motivation certainly helps keep students on track.

Attend all remote learning sessions for Zoom lectures and labs and check the course Canvas site and your email for class updates. This is one of the most important recommendations I can provide. There is a significant amount of learning that takes place during each class lecture and in each lab session and the optimal way to learn and keep current with the stream of content is to attend all class and lab online/live-broadcast meetings and participate in all learning activities in class and in the labs.

1. Read text book chapters and review lecture presentation materials in advance of class.
2. Participate in class discussions, problem solving sessions and office hours.
3. Ask questions to gain clarification and a correct understanding.
4. Identify, establish and maintain a compatible study environment free of distraction.
5. If helpful, and it is my recommendation, study remotely with classmates for support.
6. Learn the material as it is presented and do not accumulate unread chapters or content.
7. Do not attempt to study too much material at any one point.
8. Do not cram before exams – pace your study and problem solving at the class tempo.
9. Try to maintain a healthy lifestyle to facilitate learning and balance school, work and life.
10. Be kind to yourself and try your best to achieve success in a world beleaguered by pandemic.

Student Learning Outcome(s):

- *Apply the principles of thermodynamics, kinetics, equilibrium to biologically important molecules.
- *Conduct spectroscopic analysis and identify structures of biologically important molecules.
- *Generate stepwise reaction mechanisms of biologically important molecules.
- *Design logical syntheses and structural modifications of biologically important molecules.