CHEMISTRY12B SYLLABUS

GENERAL INFORMATION Winter 2021
CHEMISTRY12B (CHEMD012B.03Z and CHEMD012B.04Z) CRN 34851 and CRN36378
Instructor: Chad Miller E-mail: millerchad@fhda.edu

Lecture [Professor Miller]	**Tuesday & Thursday**	**10:30AM – 11:45AM**	**Online Zoom**
Lab (CRN34851) [Professor Snelling]	**Tuesday & Thursday**	**8:30AM – 10:20AM**	**Online Zoom**
Lab (CRN36378) [Professor Miller]	**Tuesday & Thursday**	**2:30PM – 4:20PM**	**Online Zoom**
Lecture Office hours [Professor Miller]	**Friday**	**10:00AM –12:00PM**	**Online Zoom**

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

Course Description: Course Description: Chemistry 12B is the second quarter of a year-long organic chemistry course sequence for chemistry majors and various pre-professional tracks. The second class in this series is designed to extend the fundamental concepts of organic reactions, stereochemistry, regiochemistry, equilibrium, mechanism, and retrosynthesis to a much broader range of functional groups, including: alcohols, ethers, thiols, sulfides, disulfides, aldehydes, hemiacetals, acetals, ketones, hemiketals, ketals, imines, enamines, hydrazones, and oximes. The synthesis of larger molecules using carbon-carbon bond forming reactions and protecting groups will be presented. The reactivity of conjugated and aromatic compounds such as benzene will also be explored, including a discussion of the extension of molecular orbital theory to delocalized systems. A grade of C or better in Chemistry12A is a prerequisite.

Required Materials:

- ✓ **Computer or laptop capable of using Zoom meetings with audio, video and chat, Canvas, viewing Web content and videos such as YouTube, E-mail** 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.
- ✓ **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)

Important Dates: Please note the following dates

- ☑ ***Jan 5*: Attend the 1st class lecture and your 1st lab session to maintain registration in this course.**
- ☑ ***Feb 26*: Last day to drop a 12-week class with a grade of 'W'. https://www.deanza.edu/calendar/**
- ☑ ***Mar 25*: Final Exam 9:15AM – 11:15AM. http://www.deanza.edu/calendar/final-exams.html**

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 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 on-line tutoring on a range of subject matter including chemistry.
- **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 CHEM12B Chad Miller Winter 2021

Assessment	Points Each	Total Points	Percent
Midterms (3)	200	600	60%
Final exam (1)	200	200	20%
Lab assignments (4)	25	100	10%
Lab quizzes (2)	25	50	5%
Lab exam (1)	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:

1. Competency in experimental principles will be assessed by lab assignments, quizzes and an exam.
2. Laboratory experience is an essential component of this course and is integral to the curriculum. The lab content will be delivered online using Zoom as the means for remote instruction
3. Attendance at the first online lab meeting is a requirement to remain registered in this course.
4. All submitted written work related to the lab must be of the student's original authorship regardless if the lab activity was performed individually or with a lab partner. On occasion, students may share experimental data however all lab activities and assignments must be done individually. 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.
5. Lab assignments will vary in content, format and point allocation. The instructor will provide details as they pertain to the individual lab assignments.
6. Lab assignments will be due on scheduled dates. There will be no (zero) make-up lab assignments.
7. If three (3) or more online Zoom lab sessions are missed as unexcused absences (not attended) a grade of 'F' will result in the course. It is thus highly recommended to attend all lab sessions and not risk a non-passing course grade.

Two (2) lab quizzes and one (1) lab exam:

1. The dates of the lab quizzes and exams are indicated on the schedule.
2. It is imperative that students take these assessments on the scheduled dates since no make-up quizzes or exam can be provided.

Three (3) Midterm Exams:

1. The dates of the lecture midterm exams are defined in the Schedule. Midterms are taken during the class lecture time and students must join the class lecture Zoom meeting in order to take the midterm.
2. Scores will not be dropped and midterms need to be taken on their scheduled dates.
3. 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:

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 course.
2. The Final exam cannot be rescheduled, dropped from the total course grade or substituted.
3. The Final exam will be given online during a Zoom class meeting on Thursday, March 25, 2021 at 9:15AM – 11:15AM (PacificTime).

Student handling of course materials and their distribution: Important information for all students.

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, 3rd 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.

SCHEDULE CHEM12B Winter 2021 Chad Miller (Class lecture & Lab sections - subject to change)

Week	Day/Date	Lecture Content	Lab Content	Exam Dates
1	Tues 1/05	Introductions. Syllabus. Chem12A review: Stereochemistry; S_N1, S_N2, E_1, E_2; carbocation chemistry; alkenes	Summary review of Chem12A topics: Alkene reactions and synthesis strategies	
1	Thur 1/07	CH9: Alkynes: acetylides; preparation, hydrogenation, reduction	IR/NMR Spectroscopy techniques and spectral interpretation	
2	Tues 1/12	CH9: Reactions; halogenation, HX, hydration; hydroboration; oxidation	IR/NMR Spectroscopy problem solving Synchronous (on Zoom) Lab assignment 1	
2	Thur 1/14	CH12: Alcohols: Properties of alcohols; hydride reductions; Grignard reactions, protection & deprotection	Hydride reduction reagents & techniques Lab 1: Reduction of 9-fluorenone **Theory:** 621-624,651-652 **Proc:** 653	
3	Tues 1/19	CH12: alkyl halides using HX, PBr_3, $SOCl_2$; $POCl_3$; oxidations H_2CrO_4, $KMnO_4$, PCC, Swern CH13: Ethers(thio), epoxides	Lab discussion: $NaBH_4$ Benzoin reduction & hydride reduction of 4-t-butylcyclohexanone: Example of stereoselectivity	
3	Thur 1/21	*Synthesis strategies 1 and Midterm1 group study session*	Oxidation reagents & techniques Lab2: Oxidation of cyclododecanol **Theory:** 585-593 **Proc:** 593-595	
4	Tues 1/26	MIDTERM 1	Asynchronous activity: Lab assignment 2	MIDTERM 1
4	Thur 1/28	CH19: Aldehydes and ketones: properties, preparation; nucleophilic additions, Grignard, acetal formation	Lab discussion: Chemistry and techniques of acetal formation in synthesis. Bio-organic examples.	
5	Tues 2/02	CH19: Wittig reaction; preparation; mechanism; use in synthesis; reductions; Grignard reactions	Grignard reagents & techniques Lab3: Grignard reaction (Part A) **Theory:**715-719,725-727 **Proc** 719-720, 728-731	
5	Thur 2/04	CH19: Reactions with amines to form imines & enamines; cyanohydrin, Baeyer-Villiger oxidation	Wittig reagents & techniques Lab4: Wittig reaction (Part A: Z & E-stilbene) 675-679	
6	Tues 2/09	*Synthesis strategies 2 & Midterm2 group study session*	Lab discussion: Variations on the Wittig reaction in synthesis	
6	Thur 2/11	MIDTERM 2	Asynchronous activity: Lab assignment 3	MIDTERM 2
7	Tues 2/16	CH16: Dienes & conjugated systems: MO theory; thermodynamic & kinetic control; organocuprates vs Grignard additions	Lab quiz 1	
7	Thur 2/18	CH16: Pericyclic reactions; MO theory; Diels Alder; regioselectivity; transition states and endo vs exo stereochemistry	Kinetic and thermodynamic control Lab5: **Theory:** 443-448 **Proc:** 448-450 Additional examples	
8	Tues 2/23	CH16: Electrocyclic reactions; orbital symmetry; conrotatory & disrotatory mechanisms; Woodward-Hoffmann rules; sigmatropic rearrangements	Diels Alder reagents & techniques Lab6: Diels Alder reaction Part A **Theory:** 421-425 **Proc:** 426	
8	Thur 2/25	*Synthesis strategies 3 & Midterm 3 group study session*	Lab discussion: electrocyclic reactions in synthesis; thermal & photochemical methods	
9	Tues 3/02	MIDTERM 3	Asynchronous activity: Lab assignment 4	MIDTERM 3
9	Thur 3/04	CH17: Aromaticity; benzene; MO theory; Huckel's rule; Frost circles; heterocycles	Lab quiz 2	
10	Tues 3/9	CH18: Aromatic substitution; EAS; activation-deactivation; directional effects; Friedel-Craft; NAS; benzylic oxidation, Birch reduction	Friedel-Crafts reagents & techniques Lab7: Friedel-Crafts acylation **Theory:** 499-500,511-513 **Proc:** 513-514	
10	Thur 3/11	CH18: EAS & NAS in synthesis	Review of lab topics	
11	Tues 3/16	Course review	Lab Exam	Lab Exam
11	Thur 3/18	Final exam study session		
12	Thur 3/25	FINAL EXAM 9:15AM – 11:15AM		FINAL EXAM

CHEM12B WINTER 2021 SUCCESSFUL STUDY PRACTICES

This is the second 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. 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):

*Construct logical multi-step syntheses for organic molecules
*Use Molecular Orbital theory and Resonance to explain reactions of benzene and other molecules with conjugated systems
*Increase breadth of knowledge of organic reactions to include functional groups containing oxygen, benzene and more complex systems
*Construct molecular structures of increasingly complex molecules from IR, 1H NMR, and 13C NMR data