

CHEM 60: General, Organic, and Biological Chemistry

Science is everywhere. It is not something you can step around or over and say that's science and I'm not about science. Science is about you. - Neil DeGrasse Tyson

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Office Hours:

Monday: 6:30 p.m. to 7:30 p.m.

Tuesday: 10:00 a.m. to 11:00 a.m.

Wednesday: 10:00 a.m. to 11:00 a.m.

Thursday: 10:00 a.m. to 11:00 a.m.

Class Lectures:

Tuesday and Thursday: 8:30 a.m. to 10:00 a.m. (Lecture: YouTube Live)

Labs (Face-to-Face: Kathleen Doyle Hall, Petaluma Campus Room 208 AND Online):

Tuesday: 11:00 a.m. to 3:00 p.m. – Section 0305 (Professor Chase Grill)

Thursday: 12:30 p.m. to 4:30 p.m. – Section 0402 (Professor Cornett)

Class Description:

Welcome to CHEMISTRY 60: General, Organic, and Biological Chemistry!

Living in a world of chemistry, molecules are everywhere. For this reason, knowledge of chemistry is highly useful for everyone as a familiarity with chemistry gives a greater appreciation of our physical world. In particular, mastery of chemistry provides an essential foundation for scientists, health professionals, engineers, food scientists, and nutritionists.

My primary goal for this class is to teach you the chemistry that will allow you to be the best and most-knowledgeable health professionals. At times this will be fundamental chemistry; these are the necessary foundations. At other times this will be explaining medical tests, a bodily function, or a medical device. The science of BOTH is important. The best health professionals are those who can adapt to new scenarios and explain the science of what they are doing and my goal is for you to gain strong skills in this. Wouldn't it make small talk easier if you could explain to a future patient how the pulse oximeter (finger-pluse device) works while waiting to take the pulse?

Learning chemistry takes hard work. However, with the proper work, anyone can be very successful. That means you! It is my goal to use this class to super-charge your learning and help you see why chemistry is cool and fun!

COVID-19 Statement:

I understand these are exceptional times that require, well, exceptions. Most notable, we are hosting only FOUR in-person labs. I reserve the right to change/modify what is written in this syllabus. I strive to be flexible so that I can help you reach your maximum potential given these trying times. However, this does not mean I will grant exceptions to all requests. A certain amount of the traditional class must be retained in order for the class to still be CHEM 60. This is all new and will be dealt with on a case-by-case basis. But regardless, if you are struggling, please talk with me! I promise to help and this can take various forms.

COVID-19 has forced EVERYONE to be an online student. Although students can indeed thrive online, most people prefer face-to-face learning and do better in that environment. I will do my best to help you during this rapid transition. Some things to be aware of are: 1) online classes require **exceptional** attention to announcements/emails, 2) it is harder (not impossible) to build community, and 3) engagement is different (some people will find it easier to ask questions online while others will find it more difficult). Try to identify and be mindful of how you are as an online student. Please identify how online learning may be more difficult for you and simply having this knowledge will help you better manage these difficulties.

Please let me know if/when you are having difficulties. If I do not know what is going on, it is harder for me to know or help! Feel free to check in during office hours!

Student Learning Outcomes:

Upon successful completion of this course the student will be able to:

1. Recognize and apply the underlying chemical foundations of medicine and life.
2. Correlate microscopic and macroscopic behavior of matter.
3. Solve quantitative problems relating to chemical principles.
4. Safely use basic equipment to observe and measure chemical and physical properties in the laboratory.

The student learning outcomes as stated in the official SRJC Course Outline of Record may be found at: https://portal.santarosa.edu/SRWeb/SR_CourseOutlines.aspx?Semester=20207&CVID=36978

Prerequisites:

NONE!

Recommended Preparation:

Eligibility for MATH 150B or equivalent AND eligibility for ENGL 100 or ESL 100.

Required Course Materials:

- Textbook: Bettelheim, F.; Brown, W.; Campbell, M.; Farrell, S.; Torres, O.; and Madsen, S. *Introduction to General, Organic, and Biochemistry (12th Edition)*, Cengage Learning, (2020).
SELECT ONE OF THE FOLLOWING TEXTBOOK OPTIONS:
ISBN: 9780357091791 (Traditional Textbook: loose-leaf book + online book + OWLv2)
ISBN: 9780357700006 (Cengage Unlimited: online book + OWLv2 for 120 days)
- Chemistry Molecular Model Kit with Orbitals: https://www.indigostruments.com/molecular_models/student_sets/molecular-kit-organic-chemistry-set-68845nv.html
- Laboratory Manual: *Chemistry 60 Fall 18 Lab Manual*, Santa Rosa Junior College, (Fall 2018).
- Laboratory Notebook: Standard laboratory notebook with numbered pages. This can be a low-cost notebook as long as you write in the page numbers in pen.
- Laboratory Safety Equipment: Safety goggles and laboratory apron.

Attendance:

Attendance is HIGHLY SUGGESTED for lecture. I understand many of you may have work and/or family obligations in addition to circumstances that may quickly change with COVID-19. For this reason I am having lectures on YouTube Live where they will be recorded and saved. I will not take lecture attendance. Attendance is **important** and **required** for all students for **LAB. THERE WILL BE NO MAKE-UPS ON LABS OR EXAMS FOR ANY REASON OTHER THAN A DOCUMENTED MEDICAL EXCUSE.** Missing more than two labs will result in an “F” for the entire course, regardless of the student’s performance in the class.

Academic Standard:

Your learning in this class hinges upon all work being original and something you can stand behind and be proud of. Plagiarized work or any form of academic dishonesty deprives you of this learning experience. **ALL cases will be given zero credit AND will be reported to the Vice President of Student Services.**

For exams you may only use a calculator. You may **NOT** use any other Canvas page other than the exam page (this IS cheating) and may not access **ANY** external resource (book, website, friend, etc.). **If I suspect any breach of academic integrity I reserve the right to have you redo sections of the exam online over Zoom, and assign your exam score based on your real-time answers.**

Reading Assignments:

The lecture is designed to help you understand the material presented in the textbook. You must read the book either before or right after class. **Lecture alone will not cover all the required material. To gain all this material you need to read the book and do the homework. Make sure to do the reading before starting the homework. This will SAVE you time and increase your learning.**

Homework (OWL):

Learning chemistry is like learning to play a new musical instrument. Just as a musician must devote regular practice time daily to mastering the instrument and developing musical proficiency, you too must regularly practice chemistry. Furthermore, **regular and consistent practice** is what allows one to move from being proficient at an instrument to being a master: although a first-year and professional musician can both play “Twinkle Twinkle Little Star,” one can easily hear who has mastered the instrument. Despite both musicians playing the notes correctly and in the correct order, the professional musician will play with spectacular tone, dynamics, articulation, character, etc. To learn these subtle elements of musicianship takes time and practice. The same applies for chemistry. The first learning of the material will teach you the major concepts, but through practice and asking many questions will you, like the professional musician, master the material and have a command of chemistry.

Collaboration on homework is highly encouraged. However, simply copying another student’s work (this includes people on Chegg etc.) deprives you of the learning experience and necessary practice. **It is also highly recommended that you start all assignments early so you can have ample time to think about the material and ask questions: hours of work distributed over a week are more useful than the same number of hours packed into a single day.**

Laboratory Coursework:

Chemistry is very similar to cooking and this is particularly true for chemistry. In cooking you must **first** learn how to cook safely (wear oven mitts etc.) and in the lab we will also start with chemical safety. Because chemical safety is important for you and the lab community, elements of chemical safety will be included on the exam.

Ultimately, the goal of cooking is to make a dessert, such as a decorated five-layer ice cream cake. To make this cake you must first learn how to use cooking utensils, a cake pan, an oven, an ice cream machine, decorating tools, and (very importantly!) how to clean up the kitchen when you are done. However, in culinary school you will not be asked to make this cake on the first day. You will master cakes, ice cream, and cake decorating all separately before combining these techniques to make a spectacular cake. The same applies in chemistry. Because each experiment draws upon the previous techniques learned it is **important to understand the theory and practice of what we learn each week AND review your lab coursework in parallel with your lecture coursework.**

Class Participation:

Chemistry is a subject that is best learned by doing. This requires constant and engaged participation both in **AND** out of class. Science is a communal subject where discovered knowledge is slowly built upon by others. The end result is a collective body of knowledge that is the product of many, many, hard-working people. Thus, it is important to clearly communicate your scientific ideas and work together toward a common goal or objective. You will find that this process of learning is highly engaging, stimulating, and fun!

Labs: Please see and follow to the guidelines provided by your laboratory instructors (Professors Chase Grill and Cornett).

Exams:

There will be three exams **and** a final (cumulative) exam. **NO MAKE-UP EXAMS WILL BE GIVEN IN THIS COURSE.** If an exam is missed, a score of zero will be recorded. An exam will be excused only if proper documentation is provided.

The score of the lowest exam will be replaced by the score of the final exam **if** the final exam score is higher. In the case where an exam receives a 0 due to academic dishonesty, the score of 0 will not be replaced.

Accommodations for Students with Disabilities:

Students needing an academic accommodation based on a disability should contact the Disability Resources Department (DRD) located on the 3rd Floor in Bertolini Hall. When possible, students should contact the DRD within the first two weeks of the semester as reasonable notice is needed to coordinate accommodations. Once contacting the DRD, please provide me the authorization letter as soon as possible and see me in office hours to discuss the accommodations. For more information please visit drd.santarosa.edu or call at (707) 527-4278.

Student Conduct:

We will conduct ourselves in a manner, which reflects our awareness of common standards of decency and the rights of others. All students are expected to know the Student Conduct Policy and adhere to it in this class. Students who violate the code may be suspended from two classes and may be referred to the Conduct Dean for discipline. The Student Conduct Policy can be found at: <https://student-conduct.santarosa.edu/>.

Grading:

This class is graded based on the following percentages for different evaluation categories. The evaluation categories are weighted as follows:

Evaluation Category	Percentage
Exams	30%
Quizzes	15%
Homework	15%
Labs	20%
Final Exam	20%

Final course and letter grades are assigned as follows:

Letter Grade	Percentage
A	$\geq 88\%$
B	$\geq 77\%$
C	$\geq 67\%$
D	$\geq 50\%$
F	Below 49%

To pass CHEM 60 you must earn above 50% for **BOTH** the lecture and lab components. Students may vary in competency levels and abilities based their prior backgrounds. Students can expect to acquire these abilities only if they honor all course policies, attend class meetings regularly, complete all assignments in good faith and on time, and meet all other course expectations.

Important Dates:

Date	Activity
August 23, 2020	Last day to register/add without instructor's signature/add code
August 30, 2020	Last day to drop a semester-length class and be eligible for a refund
September 7, 2020	Labor Day Holiday (No classes)
September 8, 2020	Professional Development Flex Day (No classes)
September 6, 2020	Last day to register/add WITH the instructor's signature or add code Last day to drop a class without "W" symbol
November 11, 2020	Veteran's Day Holiday (No classes)
November 15, 2020	Last day to drop a class with "W" symbol
November 26, 2020	Thanksgiving Day Holiday (No classes)
December 15, 2020	Cumulative Final Exam

Tentative Lecture Schedule:

Week	Week Beginning (Monday)	Day	Topic	Textbook Chapter
1	Aug. 17	Tuesday	Introduction, Matter, Energy, and Measurement	1
		Thursday		
2	Aug. 24	Tuesday		
		Thursday		
3	Aug. 31	Tuesday	Atoms	2
		Thursday	Atoms/Chemical Bonds	2/3
4	Sept. 7	Tuesday	<i>No Class</i>	
		Thursday	Chemical Bonds	3
5	Sept. 14	Tuesday	Chemical Reactions and Energy Calculations	4
		Thursday		
6	Sept. 21	Tuesday	<i>Exam #1</i>	
		Thursday	Chemical Reactions and Energy Calculations/Gases, Liquids, and Solids	4/5
7	Sept. 28	Tuesday	Gases, Liquids, and Solids/Solutions and Colloids	5/6
		Thursday	Solutions and Colloids	6
8	Oct. 5	Tuesday	Reaction Rates and Chemical Equilibrium	7
		Thursday		
9	Oct. 12	Tuesday	Acids and Bases	8
		Thursday		
10	Oct. 19	Tuesday	Alchemy/Organic Chemistry	10
		Thursday	Alkanes	11
11	Oct. 26	Tuesday	Alkenes, Alkynes, and Aromatic Compounds	12
		Thursday	<i>Exam #2</i>	
12	Nov. 2	Tuesday	Alcohols, Ethers, and Thiols	13
		Thursday	Amines/Aldehydes and Ketones/Carboxylic Acids	15/16/17
13	Nov. 9	Tuesday	Mechanisms: Nucleophiles, Electrophiles, and Leaving Groups	N/A
		Thursday	Carboxylic Anhydrides, Esters, and Amides	18
14	Nov. 16	Tuesday	Carbohydrates	19
		Thursday	<i>Exam #3</i>	
15	Nov. 23	Tuesday	Lipids	20
		Thursday	<i>No Class</i>	
16	Nov. 30	Tuesday	Proteins	21
		Thursday	Nucleotides, Nucleic Acids, and Heredity	24
17	Dec. 1	Tuesday	TBA/Enzymes/Neurotransmitters and Hormones	22/23
		Thursday	TBA/Bioenergetics/Physical Virology/Immunochemistry	26/NA/30

Cumulative Final Exam: Tuesday, December 15 from 7:00 a.m. to 9:45 a.m.

Laboratory Schedule:

Week	Topic
1	Lab Intro/Safety
2	Locker Check-In/Measurements (IN LAB)
3	Identifying a Pure Substance (IN LAB)
4	TBA
5	Lewis Structures
6	Separating a Heterogeneous Mixture (IN LAB)
7	Observing Chemical Reactions
8	Stoichiometry (Handout)
9	Acids, Bases, and Buffers
10	Energy in a Cashew
11	Isomers (Handout)
12	How Much Sugar is in my Drink?/Locker Check-Out (IN LAB)
13	Isolation and Analysis of Vegetable Pigments
14	TBA
15	TBA
16	Starch Hydrolysis by Amylase (Handout)
17	Label Reading

The above schedules, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement and-or to ensure better student learning.