



CHEM 103Lxg
Chemistry for the Environment and Life
4.0 Units
Fall 2020

Lectures: 3:30-4:50pm Tues, Thurs via Zoom

Labs: All labs are asynchronous online labs via Blackboard

Website: This course uses Blackboard

Instructor: Prof. Jasmine Bryant

Office Hours: T, Th 3-3:30pm (immediately before class)

Contact Info: bryantja@usc.edu (preferred contact method)

You can expect a reply to email within 48 hours during weekdays.

Course Description

Welcome to CHEM 103. This is a one semester, rigorous introductory chemistry lecture and laboratory course that covers important aspects of general and organic chemistry as they apply to environmental issues and everyday life. The relevant chemistry topics include: basics of organic and inorganic structure and nomenclature, stoichiometry, solution properties, gas laws, non-covalent interactions, kinetics, equilibria, and elementary acid-base and redox reactions. The complementary laboratory features representative exercises from general, organic and analytical chemistry selected to be most appropriate for gaining a deeper knowledge of the topics.

This course is appropriate for Environmental Studies, Neuroscience, and other life science studies at USC. This course is not appropriate for medical school preparation and will not serve as a prerequisite for the organic chemistry course sequence. Students majoring in chemistry, other natural sciences, or engineering will normally register in the CHEM 105ab sequence. Consult your advisor and the instructor immediately if you have questions about CHEM 103 vs. CHEM 105ab.

Learning Objectives and Outcomes

- Demonstrate the ability to interpret and analyze quantitative information; apply mathematical principles and techniques; and to use mathematical models to solve applied problems.
- Express measurements in a variety of unit systems.
- Describe the role of protons, neutrons, and electrons in chemical and physical transformations, reactions, and trends.
- Construct and analyze Lewis structures for covalent compounds. Use these structures to predict the three-dimensional shapes of molecules and their interactions with each other.
- Use the scientific method to analyze and recommend solutions to global problems.

- Use chemical formulas and knowledge of reaction types to classify compounds into various categories: acids/bases; ionic/covalent; strong/weak electrolytes; oxidants/reductants
- Demonstrate how the particulate nature of chemical reactions relates to limiting reactants and use this to predict product yields.
- Demonstrate how the behavior of gas phase chemical systems respond to changes in conditions.
- Correlate the physical and chemical properties of molecules with the energy released or absorbed in chemical reactions.
- Describe the composition and concentration of solutions involving solids, liquids, and / or gases.
- Predict the behavior of acids and bases in water. Describe these behaviors in terms of pH.
- Discuss the advantages and disadvantages of various sources of energy, including fossil fuels, nuclear, and solar power. Propose criteria for how fossil fuel energy sources should be evaluated.
- Relate the three-dimensional shape of molecules and their chemical properties to their role in human systems; especially antibiotics, drugs, and other biomolecules.
- Investigate a variety of chemical properties in the laboratory while utilizing proper safety precautions and data collection techniques.

Prerequisite(s): None.

Recommended Preparation: Some familiarity with chemistry is helpful, but not required.

Course Notes

Lecture notes will be available on the course website. This course uses PollEverywhere for in-class work. An internet-enabled device is required for every class meeting. Chem 103 requires everyone to use a scientific calculator on each quiz.

Required Readings and Supplementary Materials

Textbook: *A Visual Analogy Guide to Chemistry*, Paul A. Krieger (available in bookstore)

Calculator: A scientific calculator will also be needed.

Description and Assessment of Assignments

Assignments in the course include quizzes, laboratory reports, in-class work (typically worksheets and in-class problem solving), and a final project.

Grading Breakdown

There will be 11 quizzes (10 will count toward your final grade) and a final project. Your grade will be determined according to the following distribution:

Assignment	% of Grade
Quizzes (10)	40%
Laboratory	25%
In-Class Work	7%
Reading Quizzes	8%
Final Project	20%
TOTAL	100%

Grading Scale

Course final grades will be determined using the following scale

Grade	Points	%
A	930-1000	93-100
A-	900-929	90-92.9
B+	870-899	87-89.9
B	830-869	83-86.9
B-	800-829	80-82.9
C+	770-799	77-79.9
C	730-769	73-76.9
C-	700-729	70-72.9
D+	670-699	67-69.9
D	630-669	63-66.9
D-	600-629	60-62.9
F	Below 600	Below 60%

Assignment Rubrics

Laboratory case studies will be completed via Blackboard. There are 10 laboratory experiments, each worth 25 total course points.

Final Project

You will create a written or digital presentation relating any of the topics we have covered in this course to some day-to-day aspect of your life. Your presentation may be in any of the following formats: essay, news story, song, music video or parody, poster, artwork, etc. Possible example topics are: gas laws / how refrigerators work; gas solubility in water / ocean acidification; intermolecular forces / laundry detergent, etc. Your presentation must not exceed three minutes in length (or three pages written) and must be able to be uploaded to the course Blackboard site. Your presentation will be graded on accuracy, relevancy, presentation, focus, organization, references, and style. This presentation is worth 20% of your overall grade in the course, with 5% of this based on peer evaluation. Final products are due by noon on Tuesday, November 3rd.

Assignment Submission Policy

All assignments are due by the posted deadline. No late work will be accepted.

Grading Timeline

Most assignments will have scores posted within 5 days of the due date.

Additional Policies

Weekly Quizzes: There will be eleven weekly quizzes. These will test your understanding of the material covered in the class to that point. Weekly quizzes are graded on accuracy and you have one timed attempt at the quiz. Weekly quizzes must be your own individual effort – no consultation with others or the internet are allowed. You are allowed to use your notes and/or textbook. No make-up quizzes will be given. Your lowest quiz grade will be dropped. *A missed quiz will be counted as a zero towards your final grade and this will be the only score dropped.*

Lecture Attendance: The lecture period will be used to teach concepts and work in groups or individually to solve problems. In-class work will be assigned and collected that day. If you cannot attend the live zoom meetings, alternative assignments will be offered.

Course Schedule: A Weekly Breakdown

	Topics	Assignments
Week 1	Course Intro.; Measurement, Uncertainty, Sig. Figs.; Matter & Energy;	Reading Quiz Quiz 1
Week 2	Scientific Method; Atoms & Elements; Electronic Configuration	Lab #1 Reading Quiz Quiz 2
Week 3	Intermolecular Forces; Special Properties of Water; Naming Compounds	Lab #2 Reading Quiz Quiz 3
Week 4	Chemical Bonds; Formulas and Structures; The Mole	Lab #3 Reading Quiz Quiz 4
Week 5	Molar Mass; Chemical Reactions & Balancing	Lab #4 Reading Quiz Quiz 5
Week 6	Gases; Gas Laws; Solutions & Solubility	Lab #5 Reading Quiz Quiz 6
Week 7	Acids & Bases; Equilibrium	Lab #6 Reading Quiz Quiz 7
Week 8	Nuclear Reactions	Lab #7 Reading Quiz Quiz 8
Week 9	Organic Chemistry; Functional Groups; Isomers	Lab #8 Reading Quiz Quiz 9
Week 10	Vaporization & Phase Changes	Lab #9 Reading Quiz Quiz 10
Week 11	Thermodynamics; Powering the Planet	Lab #10 Reading Quiz Quiz 11
Week 12	Final Project Presentations	
Week 13	Final Project Presentations	

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call

engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call

engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086

equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421

studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.