



**CHEM 103Lxg**  
**Chemistry for the Environment and Life**  
**4.0 Units**  
**Fall 2019**

**Lectures: 3:30-4:50pm Tues, Thurs in SLH 100**

**Labs: Meet Monday, Thursday or Friday for 3 hours.**

**Website: This course uses Blackboard**

**Instructor: Prof. Jasmine Bryant**

**Office: SGM 450**

**Office Hours: T 1-2:30pm and W 10-11:30am**

**Contact Info: bryantja@usc.edu (preferred contact method), Phone: 213-740-3235**

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

**Teaching Assistants: (Office hours are held in the Chemistry Study Center, 1<sup>st</sup> floor of SGM)**

**Name: Rodrigo Elizalde Segovia** (Lab M 9am-noon; M 1-4pm)

**Office Hours: T 1-2pm**

**Contact Info: elizalde@usc.edu**

**Name: Advait Murali** (Lab F 9am-noon; F 1-4pm)

**Office Hours: Th 3-4pm**

**Contact Info: amurali@usc.edu**

**Name: Laura Mugica Sanchez** (Lab M 4-7pm; Th 9am-noon)

**Contact Info: mugicasa@usc.edu**

**Burg Graduate Student Teaching Fellow**

**Name: Anastasiia Sadybekov**

**Office Hours: Th 1-2pm**

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**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 non-programmable scientific calculator on each exam.

### Required Readings and Supplementary Materials

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

**Lab Manual:** *Exercises for the General, Organic, and Biochemistry Laboratory – USC Custom Edition* (available in bookstore)

**Laboratory Safety Equipment:** Eye protection must be worn in all laboratories whenever any laboratory work is in progress. A 100% cotton lab coat, closed-toe shoes, and long pants must be worn when doing experimental work. Shorts and sandals are NOT allowed in the laboratory. You will not be allowed to participate in the experiment if you are not wearing the appropriate protective clothing. Safety glasses and lab coats are available in the bookstore or through online retailers.

### Description and Assessment of Assignments

Assignments in the course include exams, laboratory reports, and in-class work (typically worksheets and in-class case studies with clicker questions).

### Grading Breakdown

There will be three one-hour exams and a final exam. Your grade will be determined according to the following distribution:

Assignment	Points	% of Grade
Exam 1	120	12%
Exam 2	120	12%
Exam 3	120	12%
Laboratory	270	27%
In-Class Work	100	10%
Reading Quizzes	50	5%
Final Exam	220	22%
<b>TOTAL</b>	<b>1000</b>	<b>100%</b>

To receive a passing grade, satisfactory work must be done in both lab and the lecture portions of the course. **You are encouraged to check your grades on the Chem 103 website.**

## Grading Scale

Course final grades will be determined using the following scale

Grade	Points
A	930-1000
A-	900-929
B+	870-899
B	830-869
B-	800-829
C+	770-799
C	730-769
C-	700-729
D+	670-699
D	630-669
D-	600-629
F	599 and below

## Assignment Rubrics

Laboratory reports consist of three parts: the pre-lab, which must be completed and turned in prior to beginning lab; the in-lab data sheets; and the post-lab reflective exercises. There are 10 laboratory experiments, each worth 25 total course points.

## Assignment Submission Policy

Laboratory reports are due at the beginning of your lab period one week after completing the lab exercise. Pre-lab exercises are due at the beginning of the relevant lab period.

## Grading Timeline

Graded labs will be returned one week after they are submitted. Graded exams will be scanned and returned electronically within 48 hours of the exam.

## Additional Policies

**Exams:** There will be three midterms and a final. No make up exams will be given. *An unexcused missed hour exam will be counted as a zero towards your final grade.* The comprehensive final exam will be given on *Tuesday, December 17, 2-4pm*. All electronic devices such as cell phones are prohibited and cannot be used for any purpose during the exam, including keeping time. No one will be allowed to enter the exam room late or to leave early. Graded exams will be scanned and available for viewing/printing from the class web site via the class password you set up. Only non-programmable calculators may be used on the exam.

**Laboratory Attendance:** *This is a laboratory course and attendance to all lab periods is mandatory. No make-up labs can be given in this course.* Absences will be excused only for medical reasons or in the

case of extreme necessity. Written excuses or student health center slips must be presented to the instructor for approval and should be secured in advance whenever possible. In the case of an excused absence from lab, a grade will be assigned which is based on the average of the student's other lab scores. Any unexcused absence will result in a grade of zero for that laboratory. The instructor reserves the right to drop any student for excessive absences from laboratory. Students who miss **more than two experiments (for ANY reason) will automatically fail the course regardless of their lecture performance.**

**Exam Absences:** Make-up exams will not be given under any circumstances. Absences will be excused based on official University policy (verifiable illness or necessity). An excused absence from an exam will be granted only on the basis of proper documentation such as a certification provided by a physician or hospital. **Students must take at least two of the three midterms AND the final.**

**Late work:** Late lab reports will be accepted up to two days late, for half credit, after which they will not be accepted for any reason. There are no regrades for lab reports.

**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. There are no make-ups for points lost due to absences for any reason, but 10% of the in-class work points will be dropped at the end of the semester to account for unexpected absences or other issues.

## Course Schedule: A Weekly Breakdown

	Topics	Readings	Assignments
<b>Week 1</b>	T: Course Intro. & Scientific Method Th: Measurement, Uncertainty, Sig. Figs.	Chapters 1 - 2	No Lab this week Due 8/29: Ch. 2 Reading Quiz
<b>Week 2</b>	T: Lab Intro, Ch. 1 & 2 Handout Th: Matter & Energy	Chapter 3	No Lab this week Due 9/5: Ch. 3 Reading Quiz
<b>Week 3</b>	T: Atoms & Elements Th: Electronic Configuration	Chapter 4	Lab #1 – Pre-lab Due Due 9/10: Ch. 4 Reading Quiz Pt. 1 Due 9/12: Ch. 4 Reading Quiz Pt. 2 Due 9/13: Lab Safety Quiz (5pm) <i>Sept. 13: Last day to drop without a "W" to avoid tuition charges</i>
<b>Week 4</b>	T: Chemical Bonds & Exam Review Th: <b>EXAM 1</b>	Chapter 5	Lab #2 – Pre-Lab Due; Lab #1 Post-Lab Due Due 9/17: Ch. 5 Reading Quiz <b>EXAM 1 – Thursday, Sept. 19 at 3:30pm in SLH 100</b>
<b>Week 5</b>	T: Compounds & Naming Th: Formulas & Structures	Chapter 6 - 7	Lab #3 – Pre-Lab Due; Lab #2 Post-Lab Due Due 9/24: Ch. 6 Reading Quiz Due 9/26: Ch. 7 Reading Quiz
<b>Week 6</b>	T: Structure Handout Th: The Mole and Mass	Chapter 8	Lab #4 – Pre-Lab Due; Lab #3 Post-Lab Due Due 10/3: Ch. 8 Reading Quiz
<b>Week 7</b>	T: Chemical Equations & Balancing Th: Balancing Practice & Exam Review	Chapter 9	Lab #5 – Pre-Lab Due; Lab #4 Post-Lab Due Due 10/8: Ch. 9 Reading Quiz <i>Oct. 11: Last day to drop without a "W" but still incur tuition charges for this class</i>
<b>Week 8</b>	T: <b>EXAM 2</b> Th: <b>FALL BREAK</b>		No Lab this week <b>EXAM 2 – Tuesday, Oct. 15 at 3:30pm in SLH 100</b>
<b>Week 9</b>	T: Chemical Reactions Th: Gases	Chapter 10 - 11	Lab #6 – Pre-Lab Due; Lab #5 Post-Lab Due Due 10/22: Ch. 10 Reading Quiz Due 10/24: Ch. 11 Reading Quiz
<b>Week 10</b>	T: Solutions & Solubility Th: Solutions & Osmosis	Chapter 12	Lab #7 – Pre-Lab Due; Lab #6 Post-Lab Due Due 10/29: Ch. 12 Reading Quiz

<b>Week 11</b>	T: Acids & Bases, pH Th: Intro. to Organic Molecules	Chapter 13, 15	Lab #8 – Pre-Lab Due; Lab #7 Post-Lab Due Due 11/5: Ch. 13 Reading Quiz Due 11/7: Ch. 15 Reading Quiz
<b>Week 12</b>	T: TBA – Possible Guest Speaker Th: Gues Speaker Follow-up		No Lab this week <i>Nov. 15: Last Day to drop with a "W"</i>
<b>Week 13</b>	T: Fuels Analysis Th: <b>EXAM 3</b>		Lab #9 – Pre-Lab Due; Lab #8 Post-Lab Due <b>EXAM 3 – Thursday, Nov. 21 at 3:30pm in SLH 100</b>
<b>Week 14</b>	T: Powering the Planet Th: <b>THANKSGIVING BREAK</b>		No Lab this week
<b>Week 15</b>	T: Isomers Th: Isomers & Wrap-Up		Lab #10 – Pre-Lab Due; Lab #9 Post-Lab Due Lab #10 Due IN LAB
<b>FINAL</b>	<b>FINAL EXAM: Tuesday, December 17, 2-4pm in SLH 100</b>  <b><i>This is the only time during which the final exam may be taken. No make-ups. If you cannot take the final during this designated time, you should not take this course.</i></b>		

### 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](http://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](http://policy.usc.edu/scientific-misconduct).

#### Support Systems:

*Student Health Counseling Services - (213) 740-7711 – 24/7 on call*  
[engemannshc.usc.edu/counseling](http://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](http://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](http://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](http://equity.usc.edu), [titleix.usc.edu](http://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](http://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](http://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](http://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](http://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](http://dps.usc.edu), [emergency.usc.edu](http://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](http://dps.usc.edu)

Non-emergency assistance or information.