



# USC University of Southern California

## Chem 105aLg: General Chemistry (4.0 Units) Fall 2020

**Class Meetings:** This class is offered online. Asynchronous videos will be posted on the course Blackboard site. Synchronous class meetings will be held via Zoom on Tuesdays and Thursdays from 7-8:20pm. If you cannot attend the synchronous sessions, alternative assignments must be completed and turned in.

**Instructor:** Dr. Jasmine Bryant

**Office Hours:** T,Th 6:30-7pm (immediately before class, additional appointments may be requested by email)

**Contact Info:** [bryantja@usc.edu](mailto:bryantja@usc.edu) (preferred contact method)

**Lab Instructor:** Dr. Catherine Skibo

**Office Hours:** See laboratory Blackboard site for times / meeting information

**Contact Info:** (213) 740-8265, [skibo@usc.edu](mailto:skibo@usc.edu)

**Course Coordinator:** Paperwork may emailed as a PDF

**Electronic Office Hours:** MW 1:30-3pm, emailed questions answered at this time

**Contact Info:** [coord105@chemmail.usc.edu](mailto:coord105@chemmail.usc.edu)

**Teaching assistant contact information and office hours times/location can be found on the course Blackboard site.**

### Course Description

The purpose of CHEM 105a is to introduce the basic chemical principles that underlie all of the molecular sciences (from materials and nanoscience to medicine and the machinery of biology). It will introduce good lab practice and how to make decisions based on sound data. Topics covered include the structure and underlying principles of the periodic table, chemical bonding, reaction stoichiometry, properties of solutions and gases, and thermochemistry. After this course students will be both better prepared for continuing studies and have an understanding of molecular principles relevant to everyday life.

### Learning Objectives

Students who successfully complete CHEM 105a will be able to:

- Explain the chemical and physical behavior of matter based on modern atomic theory, quantum mechanics, and the resulting atomic periodicity.
- Describe the formation and energetics of chemical bonds based on electrostatic forces.
- Describe and predict the structure of covalent and ionic compounds.

- Explain the properties of chemical molecules using bonding models, including hybridization and molecular orbital theory, with the understanding of their limitations.
- Describe the physical and chemical changes taking place in chemical reactions at both the particulate and macroscopic levels.
- Recognize and classify acid-base, precipitation, and oxidation-reduction reactions.
- Use balanced chemical equations to determine quantities of reactants and products.
- Explain the behavior of gas phase chemical systems at the particulate and macroscopic level using ideal gas behavior.
- Explain the First and Second Laws of Thermodynamics in relation to chemical systems.
- Describe the energetics of a chemical system using the state function enthalpy.
- Explain macroscopic properties based on intermolecular forces within the chemical system.
- Describe the structure and properties of the liquid and solid states, as well as phase changes, at the particulate and macroscopic levels.
- Explain the chemical, physical, and thermodynamic properties of solutions at the particulate and macroscopic level.
- Clearly define a problem and develop solutions for that problem including the use of central and auxiliary equations and conversion factors.
- Apply the concepts listed above to explain and interpret empirical observations, particularly in the laboratory portion of the course.
- Prepare laboratory reports that include experimental procedures, data analysis, and scientific writing.
- Construct a poster presentation to communicate the main ideas of a topic of interest in the course.

### Required Materials

Chemistry: A Molecular Approach (5th edition) by Tro (package available in USC Bookstore includes for free the eText and Mastering Chemistry (MC not required); also available on Amazon).

Chem 105a Laboratory Manual (available for purchase in USC Bookstore)

Calculator

### Optional Materials

Solutions Manual for textbook

Calculations in Chemistry (2<sup>nd</sup> Edition) by Dahm (optional, recommended for students who desire additional practice with critical math and chemistry skills)

### Description and Assessment of Assignments

Assignments in the course include quizzes, exams, laboratory reports, and homework.

### Grading Breakdown

Your grade will be determined according to the following distribution:

Assignment	% of Grade
Weekly Quizzes (12)	36%
Concept Quizzes and Surveys	10%
Homework	10%
Laboratory	29%
Final Project	15%
<b>TOTAL</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 105a website.

## 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%

*Week 9 grade:* We do our best to inform you on your progress in the course by assigning an approximate letter grade at the end of the ninth week. This is based on your performance in the course to date. Note: this advisory letter is no guarantee of your final grade. Final grades are assigned using the grading scale, above. You are encouraged to check your scores often in Blackboard.

## Course Notes

Lecture notes will be available on the course website.

## Office Hours

You are strongly encouraged to see any TA during their office hours, not just your own. Office hours (via Zoom) for all TAs will be posted on the class website.

## Supplemental Instruction (SI)

The University has a Supplemental Instruction Program (<https://dornsife.usc.edu/chem105a/>) that we encourage you to use. The SI instructors hold weekly sessions going over the course material and problems. They also prepare mock exams, which you can use to test yourself before the midterms and finals. The SI leaders attend all of the lectures and are familiar with the lecture material.

## 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. All other graded work will be available for review on Blackboard within 48 hours of the due date with the exception of the final project, which will take more time. You can view your grades at any time on the Blackboard site.

## Additional Policies

## Live Zoom Sessions

The class will meet twice a week (TTh 7-8:20pm) for synchronous work. You are expected to attend and participate in the group breakout sessions. Time will be spent solving problems and asking any questions you have about the material. If you cannot attend the live session you will be asked to watch the video and complete an alternative assignment.

## Quizzes

**Concept Quizzes and Surveys:** Prior to each live Zoom session you will be asked to watch a few short videos and complete a related quiz (or quizzes) on Blackboard. These videos and their quizzes will help you assess your understanding of the material. There are approximately 50 videos throughout the semester. You will earn 1 point for answering each question correctly, with multiple attempts allowed. Your top 45 scores will count toward your final grade. You will not earn points for submitting answers after the deadline. Please carefully note all due dates and times (found in Blackboard). There are no make-ups and no late submissions. Occasionally surveys will be posted to the Blackboard site. These surveys will be graded on participation only – there are no right or wrong answers. Points will be awarded (as stated at the beginning of each survey) for completion of each question.

**Weekly Quizzes:** There will be thirteen 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.*

## Homework

**Packet Pages:** At the end of each module you will be required to turn in electronic copies of your unit packet pages. These packets will be graded on completion and count for 5% of your course grade.

**Summary Sheets:** Each week you will submit a summary sheet that synthesizes and integrates your understanding of the week's material in a pictorial form using flowcharts, diagrams, and graphs – rather than text. In addition to implementing deep conceptual learning, this approach allows me to keep track of your learning and misconceptions on a weekly basis. Summary sheets are due every Friday at 11:59pm, and submissions will be via Blackboard. You will also be asked to provide feedback to other students' summary sheets. These assignments will count for 5% of your course grade.

It is recommended that students spend a total of 6-9 hours per week outside of class on Chem 105a-related work. Odd-numbered end-of-chapter problems should be worked each day – answers appear in the back of the textbook. These items will not be graded, but students are expected to do them.

## Discussion Section

Discussion section meets each week on Thursdays from 3:30-4:50pm. This will be time set aside to meet with TAs, work through a few chosen end-of-chapter problems and ask any questions that may come up as you work through the material. Attendance is optional, but encouraged.

## Laboratory

**Laboratory Orientation:** A lab orientation video will be posted to the laboratory Blackboard site. You must watch the lab orientation in order to maintain your space in the lab and thus to remain in the course.

**Quiz Period/Lab Lecture:** There will be 30-minute lab lectures posted each week. Please review them prior to your lab time. A schedule of the lab lecture topics will be posted on the Chem 105a Laboratory page on Blackboard.

**Lab Scores:** See Blackboard for lab scores (reports, prelab quizzes, etc.) and informational material.

**Lab Exam:** At the end of the semester there will be two lab quizzes covering material from lab throughout the semester. Questions typically cover the procedure, safety issues, relevant chemical formulas and chemical equations, observations, calculations, and data analysis.

**Laboratory Attendance:** *This is a laboratory course and attendance to all virtual 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. For lab absences, email Dr. Skibo (skibo@usc.edu) as soon as possible in order to arrange a make-up lab or a make-up lab exam. You must arrive on time and prepared for lab. If you show up more than 10 minutes late, you will not be admitted to the lab session. Before leaving lab, you must turn in your exit ticket. Satisfactory completion of all labs and lab work is required to pass the class. Additional laboratory policies can be found in the lab syllabus.

**Late work:** Unless otherwise directed by Dr. Skibo, all lab reports are due at the beginning of the following week's lab. The lab calendar on the 105a lab page shows due dates for all assignments. ALL assignments must be submitted by November 13. Assignments received more than 9 days late will receive a maximum score of up to 5 points for the pre-lab assignment. The rest of the report will be evaluated as Pass or No Pass. Post-lab assignments will be submitted through the Chem 105a Lab Blackboard page. Please review your TA's feedback promptly. Regrades on laboratory reports must be requested within one week of when the lab report is graded.

## Final Project

At the end of the semester you will be asked to construct a poster presentation to communicate the main ideas of a topic of interest in the course. Create a poster presentation related to one of the course learning objectives (listed above). Your poster should clearly define and explain the topic you are covering, give concise definitions of the important terms, describe important and relevant equations (if applicable), describe any data that could be collected in the lab to illustrate the concepts, and explain why the topic is important to the world outside of the chemistry class. Your presentation will be graded on accuracy, relevancy, presentation, focus, organization, references, and style. This presentation is worth 15% of your overall grade in the course, with 3% of this based on peer evaluation. Final drafts are due for peer evaluation by 5pm on Sunday, November 8. Your final product is due no later than 10am on Thursday, November 19.

## Academic Integrity

All work submitted in this course must be your original work. You may not use outside sources for answers to assignments (for example, pre-lab questions, lab reports, quiz questions, homework assignments, etc.). While you may collaborate with others on laboratory work and homework assignments, work must be in your own words and reflect your good-faith efforts. It is never acceptable to use outside "tutors" or others to furnish answers for you (for example, you may not consult Chegg.com, reddit, CourseHero, etc.). Please familiarize yourself with the discussion of plagiarism and other forms of academic dishonesty in SCampus in Part B, Section 11, "Behavior Violating University Standards" [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

## Course evaluation

Students will submit confidential course evaluations, available online during week 13. More information will be provided in lecture.

**Course Schedule: A Weekly Breakdown (Tentative – changes will be announced in lecture or on Blackboard)**

	Topics	Readings	Assignments
<b>Week 1</b> Aug 17-23	Course Intro; Measurement and Units; Subatomic Particles; Electromagnetic Radiation & Light; The Nature of Light	1.6-1.9; 2.6; 8.2	Intro surveys and quizzes Unit 1 Packet Week 1 Summary Sheet Quiz 1
<b>Week 2</b> Aug 24-30	Bohr Model; Electrons as Waves; Orbitals; Electron Configuration; Periodic Table	8.3-8.6; 2.7; 9.3-9.4	Quizzes Unit 2 Packet Week 2 Summary Sheet Quiz 2
<b>Week 3</b> Aug 31-Sept 6	Periodic Trends; Representing Compounds; Bonding; Lewis Dot Structures; Electronegativity & Polarity	9.9, 3.3-3.4; 10.2-10.6	Quizzes Week 3 Summary Sheet Quiz 3
<b>Week 4</b> Sept 7-13	Resonance & Formal Charge; Octet Exceptions; Bond Energy; Naming Compounds & Molecules; VSEPR	10.8-10.10, 3.5-3.6, 11.2-11.4	Quizzes Week 4 Summary Sheet Quiz 4
<b>Week 5</b> Sept 14-20	VSEPR and Polar Molecules; Hybridization; Polyatomic Ions and Acids	11.5-11.7, 3.5-3.6	Quizzes; Unit 3 Packet Week 5 Summary Sheet Quiz 5
<b>Week 6</b> Sept 21-27	Atomic & Molar Mass; Percent Composition; Balancing Reactions & Stoichiometry	2.8-2.9, 3.5, 3.8-3.10, 4.2-4.3	Quizzes; Unit 4 Packet Week 6 Summary Sheet Quiz 6
<b>Week 7</b> Sept 28-Oct 4	Limiting Reactant & Yield; Solutions; Electrolytes; Solubility	4.4, 5.2-5.6	Quizzes Week 7 Summary Sheet Quiz 7
<b>Week 8</b> Oct 5-11	Net Ionic Equations; Acids & Bases; Oxidation States; Redox Reactions	5.7, 5.9	Quizzes; Unit 5 Packet Week 8 Summary Sheet Quiz 8
<b>Week 9</b> Oct 12-18	Gas Pressure & Gas Laws; Kinetic Molecular Theory; Intro to Thermodynamics	6.2-6.8, 7.2-7.3	Quizzes; Unit 6 Packet Week 9 Summary Sheet Quiz 9
<b>Week 10</b> Oct 19-25	Energy & Thermodynamics; Heat & Work; Enthalpy; Calorimetry	7.2-7.9	Quizzes; Unit 7 Packet Week 10 Summary Sheet Quiz 10
<b>Week 11</b> Oct 26-Nov 1	Intermolecular Forces; Phase Changes	12.2-12.8	Quizzes Week 11 Summary Sheet Quiz 11
<b>Week 12</b> Nov 2-8	Solutions & Solubility; Colligative Properties	14.2-14.6	Quizzes; Unit 8 Packet Week 12 Summary Sheet; Quiz 12 Final Project Draft – Due Nov. 8, 5pm
<b>Week 13</b> Nov 9-15	Molecular Orbital Theory & Diagrams	11.8	Quizzes; Unit 9 Packet Week 13 Summary Sheet Quiz 13
<b>FINAL PROJECT: Due by 10am on Thursday, Nov. 19</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](https://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](https://policy.usc.edu/scientific-misconduct).

### Support Systems:

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*  
[studenthealth.usc.edu/counseling](https://studenthealth.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](https://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 and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call*  
[studenthealth.usc.edu/sexual-assault](https://studenthealth.usc.edu/sexual-assault)

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

*Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298*  
[equity.usc.edu](https://equity.usc.edu), [titleix.usc.edu](https://titleix.usc.edu)

Information about how to get help or help someone affected by 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. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*  
[usc-advocate.symplicity.com/care\\_report](https://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](https://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 Campus Support and Intervention - (213) 821-4710*

[campussupport.usc.edu](http://campussupport.usc.edu)

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.