



Chem 102: The Molecular World (4.0 Units) Spring 2024

Class Meetings: Lecture and Discussion: M + W 12pm-1:50pm, THH 118

Instructor: Prof. Rebecca Broyer

Office Hours: Fridays 1-2pm and by appointment

Contact Info: rebecca.broyer@usc.edu

Teaching Fellow: Mythreyi Rayaluru

Office Hours: TBA

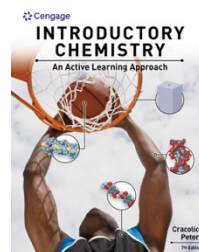
Contact Info: rayaluru@usc.edu

Learning Objectives The course consists of a theoretical and mathematical treatment of some of the fundamental principles in general chemistry. One focus is on developing a student's problem-solving skills- enabling them to find algebraic solutions to word problems. This will include a review of important mathematical concepts. A second major emphasis is on development of a basic vocabulary related to chemical concepts, including chemical nomenclature. The composition and structure of different types of matter, and changes that it undergoes will be highlighted. Several types of simple inorganic reactions will be presented and the significance of the Periodic Table of the elements will be explained.

- Formulate and carry out a plan to solve qualitative and quantitative problems related to chemical properties, composition and reactions.
- Implement written protocols to carry out basic chemical laboratory procedures independently, efficiently, and safely and interpret the resulting data.
- Summarize, explain and predict fundamental chemical principles as they relate to the behavior of matter and the periodic table.

Required Materials

- Scientific calculator with exponents and logarithms (**any calculator that does not connect internet**). I recommend Texas Instruments TI-30X IIS. Available to purchase at the USC bookstore or online
- [Introductory Chemistry: An Active Learning Approach by Mark S. Cracolice, Edward I. Peters, 7th Edition](#)
 - eBook ISBN-13: 9780357704257
 - Paperback ISBN-13: 9780357363669



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Description and Assessment of Assignments

Assignments in the course include quizzes, exams, laboratory reports, surveys and assignments

Grading Breakdown

Your course grade will be scaled to 1000 points. Your grade will be determined according to the following distribution:

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	% of Grade
Quizzes	12%
Midterm Exams	30%
Reflection	3%
Homework	15%
Practice and In Class Work	25%
Final Exam	15%
TOTAL	100%

(A) An 'A' student not only understands the course material well but also can apply it creatively to new situations. The cutoff for an 'A-' will be no higher than **90%**.

(B) A 'B' student has a good, solid understanding of the material but has trouble applying that knowledge to new situations. The cutoff for a 'B-' will be no higher than **80%**

(C) A 'C' student has major gaps in understanding. The cutoff for a 'C-' will be no higher than **70%**

(D or F) Still larger gaps lead to a 'D' or 'F' in the course. The cutoff for a 'D-' will be no higher than **60%**

Adjustments to the grade cutoffs (if necessary) will be made at the end of the course.

Point totals for the course will be available on the course Blackboard site.

Week 7 Grade:

We do our best to inform you of your progress in the course by assigning an approximate letter grade at the end of the seventh week. Note: this advisory letter grade you receive at week 7 is no guarantee of your final grade. Final grades are assigned using guidelines from previous semesters, but there is no strict grading curve.

Course Notes

Lecture notes and worksheets will be available on Blackboard. It will be imperative for you to attend class if you plan to succeed in this course. I will provide my "blank" lecture notes ahead of time via blackboard and we will work through these during lecture. I will provide opportunities during lecture for problem solving and self-assessment. Come ready to be engaged. If you are absent it will be your responsibility to get course announcements, material, and activities via blackboard. **The problems we cover during class will be very similar to the types of problems you would see on a quiz or exam.** Keep in mind that chemistry is a cumulative subject. If you miss something early on, it is going to be even more difficult to keep up later.

Supplemental Instruction (SI)

The University has a Supplemental Instruction Program (<https://dornsife.usc.edu/chem322a/>) 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.

Learning Assistants (LAs)

We will have a cohort of learning assistants present in class to help support you during in class work. Learning assistants are students who volunteer. LAs attend all lectures and facilitate recitation sessions.

Assignment Submission Policy

All assignments must be submitted by the stated deadlines. During class, you will be required to upload your work and assignments to Gradescope. Please ensure you come to class prepared with the necessary tools to do so. You will need a method to upload and submit your work to Gradescope during the class session. There are two acceptable options for submitting your work:

Working on paper: You can work on paper and then convert your work to a PDF by taking a picture of it and converting it to a digital format. After converting to PDF, you can upload it to Gradescope.

Working on a tablet: Alternatively, you may work directly on a tablet and upload your digital work directly to Gradescope. Please ensure you have access to the required equipment and software before the class starts to facilitate a smooth learning experience. If you have any questions or concerns, feel free to ask for assistance. **Late assignments will not be accepted.**

Grading Timeline

Graded work will be available for review on Blackboard/Gradescope within 48 hours of the due date. You can view your grades at any time on the Blackboard site.

Additional Policies

Class Participation: Our learning experience in this class will involve a community. The more support and courtesy you give this community the better you and your fellow students will perform. All of us in the class, you, me, your peers, have a responsibility to create an environment in which we can all learn from each other. Everyone is expected to participate in class so that we can all benefit from the insights and experiences that each person brings. Be prepared to participate individually or as a group. You may be called upon randomly to answer questions. Feel free to ask questions! Occasionally, you may be doing group activities in class and may be expected to present in front of the class or move around from group to group.

“Class attendance appears to be a better predictor of college grades than any other known predictor of college grades – including SAT scores, HSGPA, study skills, and the amount of time studying. Indeed the relationship is so strong as to suggest that dramatic improvement in average grades (and failure rates) could be achieved by efforts to increase class attendance rates among college students.” From Crede, Roch, & Kieszyńska (2010) in the [Review of Educational Research](#).

Practice (In Class Work)/Workshop: There will be several activities that count towards practice. Students will complete **work assigned during class time**, such as worksheets. Worksheets will be available to download from Blackboard. The majority of the in-class work will be graded for completion. The focus of the will be group work and improving problem-solving skills. You will need to be able to upload your work to Gradescope during class (see below) There will be no make ups for these assignments, failure to participate will count as a zero toward your final grade. In-class worksheets will be uploaded to Gradescope by the stated deadlines before the end (1:50pm). No Late submissions will be accepted however there will be a small grace period for upload at the end of each lecture. These assignments will be weighted equally and 20% of the assignments will be dropped for missed work due to illness or for any other reason.

Exams and Quizzes

There will be three 60-min exams given during class-time at 12:50 pm. No exams will be given on alternative dates and no makeup exams will be given. The exams will cover new material only (typically a few chapters) and will consist of problem-solving, multiple choice and short answer questions testing knowledge acquisition, critical analysis, integration and creative synthesis. Quizzes will be announced and scheduled at various times (not predetermined) during the course. (see below)

In some circumstances, a midterm missed due to severe illness, religious observance, or some (essential) USC activities may be excused. We must know ahead of time and will need documentation (see **Absences** section below). In this case, the balance of the lecture score will be scaled to compensate for the missing grade. **An unexcused missed hour exam will be counted as a zero. Students must take at least two of the three midterms, and the final.** If you cannot take at least two of the midterm exams, you will receive a score of zero for the second missed exam. The final exam will be given on *Friday, May 3, 2024, 11:00 a.m. – 1:00 p.m.* Although it will be comprehensive, lecture material covered after the third exam will be emphasized. This is the only time the final exam can be taken; **if you cannot take the exam at this time, do not take this course.**

Lowest score replacement: Your lowest exam score will be dropped and replaced with your score (out of 100) on the final if your score on the final is higher than your lowest exam.

EXAM 1: Jan 31, 2024 12:50pm

EXAM 2: March 6, 2024 12:50pm

EXAM 3: April 8, 2024 12:50pm

Final Exam: Friday, May 3, 2024, 11:00 a.m. – 1:00p.m.

Please bring your USC student ID card and calculator to all exams, your ID will be checked when you turn in your exam. 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 viewable on Gradescope**

Absences

No make-up exams or quizzes 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, for instance a certification provided by a physician or hospital. Please inform Dr. Broyer about the absence ahead of time; and present the valid excuse and proper document(s) to Dr. Broyer, **no later than 24 hours** after the missed exam. Students must take at least two of the three midterms, and the final. If you cannot take at least two of the midterm exams, you will receive a score of zero for the second missed exam.

Reflection

After each of the 3 exams, you will be asked to reflect on your exam and upload your reflection to Gradescope. Exam reflections will be due on Fridays at noon after each exam. No late exam reflections will be accepted. **There are no exceptions.** If you have an excused absence from an exam, an alternative assignment will be provided depending on the circumstances of your excused absence. It is your responsibility to contact the instructor about your alternative assignment.

Gradescope

Graded materials will be scanned and available for viewing/printing from Gradescope. <http://www.gradescope.com>. You will be sent an invitation from the instructor of the course. Details can be found on Blackboard

Quizzes

Quizzes will be announced and scheduled at various times (not predetermined) during the course. Quizzes will take place during lecture on days there is a quiz There will be 5-8 quizzes throughout the semester. Some quizzes will be individual while others will take place in groups of 2-3 students. Groups will be assigned and will change each quiz. Your lowest quiz score will be dropped at the end of the semester. A missed quiz for any reason will count as your dropped quiz. There are no make-up quizzes.

Homework

Prior to lecture read the sections to be covered in advance. Here is where you should be spending the majority of your time outside of class, ideally 3 hours or study for each hour of lecture, or 1-2 hours a day! This is a relatively fast-paced class so working on it a little bit every day means you won't fall behind – trying to “cram” study and memorize material is NOT a successful strategy for chemistry! Working textbook problems is the only way you can get practical experience and be prepared for exams. Try the in-chapter problems as you read the chapter and then continue to work on the end-of-chapter problems (answers at the back of the book). Working on problems means doing the problem – write down your answer and then check to see if it's right, and then try more problems. A list of “end-of Chapter” problems will be posted on the course website.

There will also be a short weekly homework assignment posted to Blackboard on Wednesdays. The homework assignments are to be completed and submitted through Gradescope by 12 pm the following Wednesday. Homework assignments will be graded. There will be a total of 13 assignments throughout the semester, your top 10 scores will count toward your grade at the end of the semester. Late homework submissions will lose one point for each 24-hour period that they are submitted after the deadline up until Fridays. After that the key will be posted and late submissions will no longer be allowed.

Drop Dates: **Friday, Jan 26, 2024:** Last day to drop without a mark of W and receive refund.
Friday, Feb 23, 2024: Last day to drop without a mark of W.

Friday, Apr 5, 2024: Last day to drop with a mark of W.

The mark of Incomplete (IN) may only be given to a student who is doing passing work through April 5, 2024 and is unable to complete the assigned work and/or take the final exam due to serious illness or a documented emergency occurring after April 5, 2024.

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. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

AI Policy:

Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually or in groups. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

Course evaluation

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

The instructor reserves all rights to change any of the contents within the syllabus with advanced notice if any changes become necessary during the semester.

How to get an **A** in this Class:

- Come prepared for class (keep up, read ahead) and stay engaged.
- Test your knowledge. Do the problems at the end of the chapters, do as many practice problems as you can! Use these to better prepare for quizzes/exams.

How to Study

It's recommended that for every 1 hour of lecture, you should do at least 3 hours of studying. Here is more advice from students who got an A in this class:

1. **Preview the chapters ahead of time.** We will be covering 0.5-2 chapters per week. Before the start of each week, spend 15 minutes looking at the pages in the chapter or posted lecture notes. Identify the headings/subtitles, bolded words, figures/figure legends, chapter objectives, summaries and think of questions you would like answered in class. Always ask "what will I learn this coming week?" and make a brief list from memory based on what you read in the chapter.
2. **Attend every class lecture and be on time.** This class meets MW from 12-1:50pm. Come prepared to take notes, pay attention, participate and ask questions. Arrive on time so you don't miss anything. Sit in the front if you feel you might be easily distracted. Eat lunch so you are not hungry. Silence your notifications and minimize other distractions.
3. **Review your notes daily.** Immediately after class, spend 15 minutes going over the notes. Fill in any gaps. Note what you do not understand. Re-write sections and fill in any gaps by looking things up (on your phone or computer or textbook) or asking friends. Formulate questions you need answered. **Read the textbook daily.** Spend 20 minutes reading in order to prepare for class. Its best to read the material before it is covered in class and re-read it again afterwards.
4. **Study (but in short intense sessions).** Intense study sessions (3-5 per day) are the most effective. The key here is repetition. Ask 'why?' Weekend review: read notes and material from the prior week to make connections.
5. **Assess (figure out whether you have learned the material).** Do the problems at the end of each chapter, and practice problems assigned by your instructors. Perform periodic "reality checks." Ask "am I using study methods that are effective? Do I understand the material well enough to teach it to others? If I was called upon in class would I be able to respond?"
- 6.

Study skills: If you would like additional suggestions on how to improve your study skills email your instructions or you can also search online. Check out our [Learning Success Resources](#) or try this web site (click on the "Explore" tab): https://www.ucc.vt.edu/academic_support/study_skills_information.html

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"Grit is passion and perseverance for very long-term goals. Grit is having stamina. Grit is sticking with your future, day-in, day-out. Not just for the week, not just for the month, but for years. And working really hard to make that future a reality. Grit is living life like it's a marathon, not a sprint." *Dr. Angela Lee Duckworth, Christopher H. Brown Distinguished Prof. of Psychology, University of Pennsylvania.*

We value **diverse voices** because integrating a diverse set of experiences is *critical* for a more comprehensive understanding of science.¹

Your instructors are still in the process of learning about diverse perspectives, identities and equity. If something is said in class (by anyone) that makes you feel unwelcome please let us know.

What is expected of me?

You are expected to act positively by having a great attitude and an open mind. You can excel in chemistry! You are expected to keep up with the material. You are expected to ask questions when you don't understand.

What do I do if I'm absent?

You should attend every class, but extenuating circumstances arise that can make this difficult. For this reason, all lecture slides and important announcements will be posted on Blackboard. In addition, try to obtain any other information from friends. Let us know if there is an emergency and you cannot come to an exam, or you will miss more than 3 classes and/or more than one quiz.

¹ Lu, H., Page, S. E. Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *PNAS*. 2004, 101, 16385-16389.
Rock, D., Grant, H., and Grey, J. Diverse teams feel less comfortable—and that's why they perform better. *Harvard Business Review*, Nov 22, 2016.
Page, Scott E. *The Diversity Bonus: How Great Teams Pay Off in the Knowledge*; Nancy Cantor and Earl Lewis/Princeton University Press: New Jersey, 2017.

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

	Topics	Readings	Assignments
Week 1 7. 1/8 8. 1/10	Syllabus and Introduction Manipulating Equations Functions	See blackboard	See Blackboard
Week 2 9. 1/17	M: MLK HOLIDAY Exponents and Logs + Word Problems	See blackboard	See Blackboard HW 1 due 1/27
Week 3 4. 1/22 5. 1/24	Word Problems Ch 2	See blackboard	HW 2 due 1/24 Quiz 1 tentative
Week 4 6. 1/29 7. 1/31	Exam and Ch. 3	See blackboard	HW 3 due 1/31 EXAM 1 1/31 12:50 on Ch 2 and math
Week 5 8. 2/5 9. 2/7	Ch 4 Ch 4	See blackboard	HW 4 due 2/7 Quiz 2 tentative
Week 6 10. 2/12 11. 2/14	Review Ch. 4 + Ch. 5	See blackboard	HW 5 due 2/14
Week 7 12. 2/21	PRESIDENTS HOLIDAY Ch. 6	See blackboard	HW 6 due 2/21 Quiz 3 tentative
Week 8 13. 2/26 14. 2/28	Ch 6 + Ch 7 Ch 7	See blackboard	HW 7 due 2/28
Week 9 15. 3/4 16. 3/6	Review Ch 7 WS + Ch 8 Ch 9 + 19	See blackboard	HW 8 due 3/6 EXAM 2 3/6 12:50pm on Ch 3-7
Spring Recess March 11-15			
Week 10 17. 3/18 18. 3/20	Ch 9 + 19 + Ch. 10	See blackboard	Quiz 4 tentative
Week 11 19. 3/25 20. 3/27	Ch 10	See blackboard	HW 9 due 3/27
Week 12 21. 4/1 22. 4/3	Chapter 14	See blackboard	HW 10 due 4/3 Quiz 5 tentative
Week 13 23. 4/8 24. 4/10	Chapter 16	See blackboard	HW 11 due 4/10 EXAM 3-4/8 12:50pm
Week 14 25. 4/15 26. 4/17	Ch. 16 + Ch 17	See blackboard	HW 12 due 4/17 Quiz 6 tentative
Week 15 27. 4/22 28. 4/24	Ch 17 + Q and A	See blackboard	HW 13 due 4/24
Final Exam Friday May 3, 2024, 11am-1pm			

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:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
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

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

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, 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

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 Student Accessibility Services - (213) 740-0776
osasfrontdesk@usc.edu

USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the [OSAS process](#)(registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at www.osas.usc.edu.

USC Campus Support and Intervention - (213) 821-4710
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

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.