Welcome to Chem 1A! Thank you for joining our community of learners dedicated to supporting each other on our quest to understand the world at the molecular level. We aim to offer a meaningful and empowering experience to every student. We will build that rich experience together by devoting our strongest available effort to the class. We are all on our own paths of knowledge and each have our own reasons for being here. But we all have something to teach our classmates and beyond.

We aim to offer a meaningful and empowering experience to every student in this course. We will build that rich experience together by devoting our strongest available effort to the class. **You will be challenged and supported.** I hope you will take an active, critical, patient, and generous role in your own learning and that of your classmates.

In this time of great uncertainty with anxiety-producing news seemingly non-stop, you may be asking yourself, “why am I here learning about atoms?” When you feel this way, please remember your own reasons for attending college and wanting to study science. **Keep that goal and vision front and center and recognize that every day you study, you are getting one step closer to your dreams.** Chemistry does matter (ask us why!), and your personal development will help you become more qualified and ready to become the leader you want to be. **If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible.** And **when you get overwhelmed, please reach out.** We are happy to work with you to meet your needs and to develop strategies to fulfill the requirements of the course. We are happy to provide you with help and support in any way possible.

We are excited to bring you Chem1A in this remote format because it provides a flexible learning environment that is responsive to your needs. All our lectures are recorded ahead of time so you can watch/re-watch at times that work for you. This means that our lecture times are all about what YOU need.

In this class, what matters most is that you learn. We take a “growth mindset” approach to learning which means that we know that learning takes time, effort, and strategy. One reason why we love Chemistry is that it builds on itself. So, when you show improvement, we reward that improvement.

We look forward to working with you for the next 5 weeks! We promise to do our best every day and know that you will do the same.

Sincerely,

Mr. Diniz and the rest of the Chem 1A Teaching Team
# How will this class work?

All content will be provided in video lectures (made by Prof. Eroy-Reveles) for you to watch at your own convenience. There will be no “lectures” at the scheduled lecture time. Instead, the first hour of the designated lecture time will be used as optional Problem-Solving Sessions (MWF 1:00pm-2:00pm) that Mr. Diniz will lead via Zoom. These sessions will be recorded and posted to our course Canvas site.

You can participate in optional Discussion Sections with our TA Katrina via zoom. These sections (limited to 24 students; first come-first served) will be collaborative and you will get to know Karina and your fellow students. Discussion Sections will occur on Tuesdays and Thursdays, with different content each day. ACE sections are available for Chem 1A: I encourage you to look at the [ACE website](#) and consider applying to this award-winning program.

ALEKS will be used for all homework assignments called “Objectives” and will be due every Tuesday and Thursday (Weeks 2-5). There will be three Knowledge Checks (a type of ungraded quiz) so you can make sure you are retaining what you are learning. Please work on ALEKS each day. Plan to spend at least 15 hours on ALEKS per week during the summer. Your final ALEKS score will be based on how much of your ALEKS pie is complete by the end of the term. You are welcome to earn “extra credit” for completing ALEKS Objectives on time.

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>10:00-11:15 am: SGT Session with Tiffany</td>
<td>10:00-11:00 am: Discussion Section A with Karina</td>
<td>10:00-11:00 am: Discussion Section B with Karina</td>
<td>10:00-11:00 am: Discussion Section A with Karina</td>
<td>10:00-11:00 am: Discussion Section B with Karina</td>
<td>1:00-2:00 pm: Problem-Solving Session with Mr Diniz</td>
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<td>1:00-2:00 pm: Problem-Solving Session with Mr Diniz</td>
<td>2:30-4:00 pm: Open Tutoring with Mr. Diniz</td>
<td>3:30-4:30 pm: Open Tutoring with Karina</td>
<td>2:30-4:00 pm: Open Tutoring with Mr Diniz</td>
<td>3:30-4:30 pm: Open Tutoring with Karina</td>
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<td></td>
<td>2:30-3:45 pm: SGT Session with Tiffany</td>
<td>6:00-7:00 pm: (Tentative) ACE Office Hours with Jorge</td>
<td>5:00-6:30 pm: ACE Session with Jorge</td>
<td>5:00-6:00 pm: (Tentative) ACE Office Hours with Jorge</td>
<td>5:00-6:30pm: ACE Session with Jorge</td>
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<td>5:00-6:00 pm: (Tentative) ACE Office Hours with Jorge</td>
<td>5:00-6:30pm: ACE Session with Jorge</td>
<td>4:00-5:00 pm: (Tentative) ACE Office Hours with Jorge</td>
<td>7:00-8:15PM: SGT Session with Tiffany</td>
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Course Description

Chem 1A is one of three courses that makes up the general chemistry sequence at UCSC (Chem 1A-1B-1C). In Chem 1A, we cover a range of topics starting with three types of chemical reactions (precipitation, acid-base, oxidation-reduction). Next, we will learn about the behavior and properties of gases. The second half of the course is devoted to learning about Equilibrium, when the concentrations of reactants and products are not changing anymore after mixing. We will study equilibrium in depth by applying principles learned to testing what happens in buffer solutions as well as acid-base titrations and the solubility of compounds.

Note about algebra: Chemistry is a quantitative science where the quantities of substances in reactions determines what happens during a reaction. We use algebra to figure out how many “moles” (6.022 x 10^23) are present in a given scenario and stoichiometry (literally in Greek “the measure of elements”) to compare relative amounts of substances to other substances based on a balanced equation.

Open Tutoring (Office Hours)

Attending Open Tutoring is a great way to get individualized help and learn about where this class is going. Links to access Open Tutoring with both Mr. Diniz and Karina will be provided under Zoom and on the class calendar in Canvas. If these times don’t work for you, please email one of us and we can find a time to meet virtually. Open Tutoring is a great time to work on ALEKS questions with us!

Required Materials

1. Computer/tablet and internet: As this course is fully on-line, you will be watching videos, participating in zoom meetings (Problem-Solving Sessions, Discussion Sections, Open Tutoring), and completing online assignments in ALEKS and other platforms. Please look at the Keep Learning website https://keeplearning.ucsc.edu or contact Mr. Diniz if you have issues accessing this class.

2. ALEKS: We will use this Web-based, artificially intelligent assessment and learning system for out-of-class work – go to aleks.com and use the class code: AACEC-PTA6U

   The ALEKS system comes with detailed explanations for every question. I will also post a study guide for the class that will direct you to relevant sections of a free general chemistry textbook called OpenStax Chemistry, 2nd edition.


3. Scientific calculator recommended: Using your phone as a calculator is not recommended. A calculator that processes log and ln functions is helpful

Course Facilitators

Instructor: Mr. John Diniz, jdiniz@ucsc.edu
I will check my email at least 2x a day. You can expect to receive a response within 12 hours during Mon-Fri 9:00-5:00pm. Night time emails might not be answered until morning and weekend emails might not be answered until Monday. With that in mind please, feel free to email me anytime, any day of the week.
Teaching Assistant (TA):
Karina Campos Salazar, kcampposs@ucsc.edu
Small Group (SGI) tutor:
Jouyen (Tiffany) Chen, jchen479@ucsc.edu
ACE Leader:
Jorge Ruiz, jolruiz@ucsc.edu
for chemistry. The TI-30X IIS Scientific Calculator is a good option because it shows entries on the top line and results on the bottom line. You can get one online for about $15. ALEKS also has a calculator built-in but getting used to using your own will help in future classes where a scientific calculator may be the only device available during a quiz. A programmable calculator is not necessary.

(Syllabus continues on Next page)
Grading in Chem 1A

Grading Philosophy for this class: We believe that everyone can learn chemistry. We recognize that your performance will be affected by your prior knowledge and many circumstances outside of your control (especially when we are learning chemistry during a pandemic!). We know that it takes time to learn and give you many opportunities to show that you are learning.

Your grade is what you earn. We do not curve grades because we don’t want your grade to change based on how others in the class performed. You are not competing with anyone.

Assessments

35% ALEKS (based on ALEKS Pie completion) - complete by Saturday, July 25 at 11:59PM
30% Quizzes (2 quizzes)
25% Final Exam - complete by Saturday, July 24 at 11:59PM
10% Essays (2 essays)

Letter Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum Score</th>
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<tbody>
<tr>
<td>A+</td>
<td>96 and above%</td>
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<tr>
<td>A</td>
<td>90-95%</td>
</tr>
<tr>
<td>A−</td>
<td>88-89%</td>
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<tr>
<td>B+</td>
<td>85-87%</td>
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<tr>
<td>B</td>
<td>80-84%</td>
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<tr>
<td>B−</td>
<td>78-79%</td>
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<tr>
<td>C+</td>
<td>73-77%</td>
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<tr>
<td>C</td>
<td>65% -72%</td>
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<tr>
<td>C−</td>
<td>60-65%</td>
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<tr>
<td>D</td>
<td>50-59%</td>
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<tr>
<td>F</td>
<td>49 and below</td>
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A grade is minimum grade to take any classes that have 1A as a prerequisite.

Letter grades will be assigned according to your total percentage score that incorporates all items above.

ALEKS Objectives

(aka Homework) - see Canvas “Info on ALEKS” module

ALEKS is the online learning system we will use in this class. The value of this program is that you get instant feedback on your work, along with support on each question. We use ALEKS because there is an explanation for every question posed. After you get three questions correct in a row, you have proved that you have learned a topic and can move on to the next topic.

ALEKS is not a platform that allows you to “cram” so please make sure you are working on ALEKS every day. During a normal 10-week quarter, students spend an average of 8-9 hours/week. During the summer, this will be about 15 hours/week. A list of the Topics by Objective is found in the “Chem1A: ALEKS Topics per Objective”. After Week 1, ALEKS Objectives will be due every Tuesday and Thursday at 11:59PM.

See the Canvas module “Info on ALEKS” to figure out what all the ALEKS terms mean: topic, objective, pie, knowledge check, etc.

***If you don’t finish all the topics in an objective by the due date, then you are invited to complete the current objective EARLY. Once you finish the current topic, then you are in “Open Pie” mode. During Open Pie, you can work on any topics you are “ready to learn” including those that
were previously not learned. There are scheduled Open Pie times as well.

**Knowledge Checks**

Knowledge checks are ungraded quizzes that help to see if you are retaining what you learned. If you answer a question incorrectly, you may be required to go back and review that topic. There will be three Knowledge Checks in ALEKS that will occur after you complete Objective 4, 6, and 8. When a Knowledge Check comes up, you can't do anything in ALEKS until you complete the Knowledge Check. **DO NOT mark “I don’t know” for all the questions just to get through the Knowledge Check fast. This will result in you having to go back and learn a lot of topics again. If this happens, e-mail Mr Diniz and he will reset the Knowledge Check so you can show that you mastered those topics.**

**EXTRA CREDIT:** Finishing ALEKS Objectives on time will earn extra credit. You can earn up to 10% extra credit (1% for each objective) for your ALEKS score.

**Quizzes and Final Exam**

We will have 2 quizzes - dates to be announced. The Final Exam will be about 2 hours. Some questions will be taken from ALEKS and some will be more conceptual. **Each quiz/exam is cumulative,** with more emphasis on new material. The Final Exam will be approximately two-thirds new material since Quiz 2 and one-third old material.

**Chemistry and Life Essays**

Short essays will help you apply what you are learning to the world around you. You will write two short essays for this course. Assignment details and a grading rubric will be provided.

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**Learning Outcomes:**

By the end of this course students should be able to

1. Understand topics including atomic structure of matter; molecules; chemical reactions; acids and bases; gases; and equilibria in the gas and liquid phase.

2. Use critical and practical thinking to analyze and evaluate chemistry problems. Students should be able to answer questions about chemistry by analyzing the problem, identifying the relevant topics and applying their understanding of those topics to arrive at a solution. Students will be able to test this answer for correctness and be able to interpret and communicate their results.

3. Recognize how each topic builds upon cumulatively such that the final topic, equilibria in the gas and liquid phase, requires students to exercise their full set of knowledge and techniques to arrive at solutions.

4. Collaborate effectively with their peers to solve problems and interact productively with a diverse group of classmates.

5. Connect course chemistry topics with the real world to understand how chemistry is relevant to our lives.

(Syllabus continues on Next page)
Resources for Success in Chem 1A

Discussion Sections

During Discussion sections, the TAs will review material and design activities to help you test your knowledge. They will also discuss study strategies that will help in all your chemistry courses. You will also work on questions that will be remarkably similar to homework and tests. This is a great time to ask questions, test out study groups, and work with your peers.

Disability Resource Center (DRC)

UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me as soon as possible in the academic quarter. Please share with me ways we can ensure your full participation in this course. I encourage all students who may benefit to learn about the DRC and the UCSC accommodation process. You can visit the DRC website at drc.ucsc.edu. You can make an appointment and meet in-person with a DRC staff member. The phone number is 831-459-2089, or email drc@ucsc.edu.

Students that have been approved for extra time on tests will receive an email from the Physical and Biological Sciences (PBSci) Testing Center (testing.pbsci@ucsc.edu) with information on where their proctored tests will take place.

Small Group Tutoring (SGT)

Small Group Tutoring (SGT) is a small study space for students to engage in critical thinking around key themes of the course with their undergraduate tutor. SGT's weekly commitment helps students build community and practice study skills outside of the classroom. Most tutoring groups vary in size between 2-10* students per session. You can access the schedule and sign up for SGT sessions by logging into Tutor Trac with your CruzID and Gold password.

Summer Session 1/ 8-week/ 10-week Session:

Students can begin signing up for SGT on Monday, June 21st and sessions will begin Wednesday, June 23rd.

Summer Session 2:

Students can begin signing up for SGT on Monday, July 26th and sessions will begin Wednesday, July 28th.

Students only have to sign up once for tutoring and their appointments will repeat weekly. Want SGT to be successful for you? Bring your books, lecture notes, questions, and be open to working collaboratively with your peers.

Academic Excellence Program (ACE)

ACE is a nationally recognized academic support program that is designed to increase the diversity of students who earn bachelor’s degrees in science, technology, engineering, and mathematics (STEM).

The sessions provide a structured setting where students teach and learn from each other. An ACE session leader, who has an academic background in the subject, facilitates the problem-solving sessions. Undergraduate co-leaders/peer mentors assist, bringing the student-to-teacher ratio to approximately 12:1. In addition to attending their ACE problem-solving sessions, students meet weekly with their peer mentor, who shares study strategies as well as opportunities for undergraduate
teaching and research internships. ACE session leaders offer weekly office hours, as well as examination review sessions and academic and career planning. ACE students join a community of STEM scholars who are dedicated to academic excellence and success.

Enrollment in ACE is limited, and priority is given to EOP students who are planning to pursue a STEM major. For more information, visit the ACE website.

**Campus Advocacy, Resources, and Education (CARE) Office**

The UCSC Campus Advocacy, Resources & Education (CARE) Office believes that all people deserve to live and engage in an environment free from violence. The CARE program provides support, advocacy, resources and violence prevention education to the UC Santa Cruz community. We respond to the needs of students, staff, faculty and non-affiliates impacted by stalking, dating/domestic violence and sexual assault by providing free and confidential services.

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the Campus Advocacy Resources & Education (CARE) Office by calling (831) 502-2273. In addition, Counseling & Psychological Services (CAPS) can provide confidential, counseling support, (831) 459-2628. You can also report gender discrimination directly to the University’s Title IX Office, (831) 459-2462. Reports to law enforcement can be made to UCPD, (831) 459-2231 ext. 1. For emergencies call 911.

Faculty and Teaching Assistants are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Office should they become aware that you or any other student has experienced sexual violence or sexual harassment.

**Academic Dishonesty**

Academic Dishonesty is an extremely serious academic offense and in cases where investigation proves a significant departure from principles, penalties can be imparted that range from partial or total loss of scores on the assignments or even in the course.

The UCSC Student Handbook and University Policies Handbook defines cheating in Section 102.11 as “fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials, which are prohibited or inappropriate in the context of the academic assignment in question.”

This includes:

- Providing answers to or receiving answers from others for any academic assignment
- Using notes, information, calculators, or other electronic devices or programs during tests or for assignments from which they have been expressly or implicitly prohibited.
- Improperly obtaining or using improperly obtained information about a test or assignment in advance of its availability to other students or assisting others in doing so.
- Putting one’s name on another person’s test or assignment.

**Please be patient with your learning.** There is no reason for anyone to be so desperate to cheat in this class. This is just the beginning of your college career. Learning and mastering the material should be the focus, not the actual letter grade for the course.
## Weekly Schedule

You are invited to take a look at the [Chem 1A Study Guide](#) for detailed alignment between topics, videos, assignments, and e-book sections.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics to be covered</th>
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| **Week 1** | **Using the Periodic Table**  
- Convert between mass, moles, and number of atoms or molecules  
- Name and write the formula of ionic compounds formed from common ions and polyatomic ions  
- Calculate average atomic mass from isotopic mass and abundance  
  **Stoichiometry of Reactions**  
- Perform stoichiometric calculations to convert between masses of reactants and products  
- Determine the amount of product or reactant remaining in a **limiting reactant situation**  
- Calculate the concentration of a solution  
  **Three Types of Reactions**  
- Describe and predict the outcome of Ionic Precipitation Reactions  
- Write molecular, complete ionic, and net ionic equations  
- Calculate the concentration of species at the end of a reaction  |
| **Week 2** | **Friday (7/2): Quiz 1: limiting reactants, precipitation reactions, reduction/oxidation**  
**Monday (6/28): Juneteenth Observed - No synchronous instruction**  
- Calculate percent yield; Use percent yield to calculate reactant amount  
- Identify and predict the outcome of acid-base reactions  
- Perform stoichiometric calculations for acid-base reactions  
- Identify oxidation-reduction reactions from changes in oxidation numbers  
- Separate oxidation-reduction reactions into half-reactions  |
| **Week 3** | **Monday (7/5): Independence Day Observed - No synchronous instruction**  
  **Gases**  
- Understand how the kinetic molecular theory of gases is consistent with the ideal gas law and perform calculations using ideal gas law PV=nRT  
- Understand and use in calculations the relationship between mole fraction and partial pressure  
- Use relative effusion rates to find an unknown molar mass  
  **Equilibrium**  
- Understand the dynamic nature of equilibrium and predict how a system at equilibrium would react to a change in conditions.  
- Write expressions for the equilibrium constant and use it to calculate equilibrium amounts from initial amounts.  
- Understand when to use the small-x approximation when solving equilibrium questions.  |
| **Week 4** | **Friday (7/16): Quiz 2: Gases, Equilibrium, pH of Acids/bases**  
**Acid-Base Equilibria** |
| Week 4 | ● Understand the difference between strong and weak acids (and bases) and calculate the pH of those solutions.  
 ● Identify conjugate acid-base pairs and predict relative acid/base strength from pKa values.  
 ● Predict the acidity/basicity of salt solutions and calculate the pH of those solutions. |
|---|---|
| Week 5 | **Buffer Solutions**  
 ● Understand how an acid/base buffer system works to maintain pH.  
 Calculate the pH of buffer solutions.  
 **Acid-Base Titrations**  
 ● Distinguish between strong acid/base and weak acid/base titrations.  
 ● Calculate the pH at any point in a titration.  
 **Saturday (7/24): Final Exam (covers everything learned in the class)** |