Welcome to Chem 1A – Fall 2022 – Sections 32189 and 32190

1. Who am I and how can you reach me?

Instructor: Dr. Josh Visser
Email: visserjosh@fhda.edu
Office: TBD – Discussed in Class
Office Hours: Monday 2:00 – 4:00 (Location TBD) | Tuesday 10:00 – 12:00 (Zoom)
***** If you cannot make it to the above office hours, please email me and we can set up an appointment.

Please email me with any questions or message me through Camino. This is the best way to get in touch with me. I will usually respond within 24 hours or less, I won't respond quickly on weekends and after 7pm.

Lecture Meetings and Locations	Days	Time	Location
Lecture (Sections 32189 and 32190)	Mon/Wed	11:30 am – 12:45 pm	S32
Lab (Section 32189)	Mon/Wed	8:30 am – 11:20 am	SC2202
Lab (Section 32190)	Mon/Wed	2:30 pm – 5:20 pm	SC2202

Course Description: This course offers and introduction to chemistry as the first of a three-quarter general chemistry series. This course will cover how we measure the properties of matter and describe the structure of atoms in the context of basic quantum mechanics. We discuss the types of chemical bonds that atoms undergo to form more complex molecules, the ratio in which atoms combine, and the shapes these molecules assume in space. Additionally, we will cover important models for covalent bonding an d explore the many types of chemical reactions. The way molecules react to form new bonds, and thus new molecules, will be connected to the transfer of heat energy and bond stability.

This course is divided into **two (2)** separate instructional periods – the lecture and laboratory sections. The lecture portion is primarily devoted to the material discussion while the laboratory portion gives students a chance to practice chemical experimentation and apply lecture concepts. Lecture and lab sections must be taken together to pass CHEM 1A and will both go towards a single grade. The course website is on Canvas and access to it will be discussed on the first day of class.

2. What do you need for the course?

Course Materials:

We will NOT be using CONNECT or ALEKS this quarter. So, when buying your textbook you don't have to purchase the access to these platforms. Instead, we will use another homework platform called Aktiv, which we will talk about on our first day of class. Additionally, the "Calculations in Chemistry" book is OPTIONAL. This book is helpful, but not required for this course, and gives additional calculation practice.

1. **Textbook**: *Chemistry: The Molecular Nature of Matter and Change*, Sildberberg and Amateis, 9th ed. (Other editions will essentially be the same and will work great for studying) This text will likely be used by your CHEM 1B and 1C instructors. There are a couple options to obtain the textbook
    a) Option 1 – Hard copy text (any edition). I might assign extra practice problems from the back of the book, which will differ slightly between editions. Regardless, this option is great if you prefer physical books and want a quality chemistry textbook for reference in the future.
    b) Option 2 – 90 day access to an electronic text specifically for CHEM 1A. This is a great, cheap option that will give 3 months of access to the textbook and is perfect if you don't plan on immediately continuing in the series. This can be purchased with ISBN: 9781307600940.

2. **Supplemental (Free) Textbook**: While lectures will closely follow the textbook above, this text gives an alternate explanation while also being a free resource. OpenStax, Atoms First 2e: https://openstax.org/details/books/chemistry-atoms-first-2e
3. **Aktiv Online Homework Platform**: This quarter, we will be using Aktiv for online homework. A subscription to Aktiv is available online through the de Anza bookstore, and I will further discuss how to subscribe to and utilize this platform on the first day of class. If this subscription proves to be an issue, please email me and we can figure out alternative methods for homework.
4. **A non-programmable scientific calculator** capable of logarithm and exponential functions. Please plan on bringing this calculator to class every day.
5. **A scanner/scanning app**: We will be submitting (lab) assignments as uploaded pdf's. Use of a scanner or a scanning app on a phone will both work for this purpose. Please let me know if this is an issue.
6. The lab content for this course will be available on the Canvas site, no lab manual purchase necessary.
7. **Lab Equipment**
    a) Goggles: For your protection, safety goggles or Visorgogs (https://www.flinnsci.com/flinn-visor-goggles/ap1362/) with indirect ventilation and an ANSI minimum rating of Z87 must be worn *AT ALL TIMES* in the laboratory while experiments are taking place. I will send out more info in an email.
    b) Personal Protective Equipment (PPE): Long pants and closed toed shoes must be worn in lab. Specifics are provided in the safety document at the end of the syllabus.
    c) Lab notebook: Any simple, ruled notebook that is permanently bound.

Canvas Course Website:
Course material including lectures, exam keys, and other resources will be posted on Canvas. Grades are also posted on this site as we go through the quarter. Announcements and other notifications will be through Camino as well. Make sure to check Canvas on a daily basis.

3. How will I learn (and how is it measured)?
Your comprehension of course material will be measured using the following grading scale

A+	≥98 %	B+	≥86 %	C+	≥74 %	D+	≥62 %	F	<55%
A	≥94 %	B	≥82 %	C	≥70 %	D	≥58 %		
A-	≥90 %	B-	≥78 %	C-	≥66 %	D-	≥55%		

(This grade scale may be adjusted by the instructor as needed)

If your exam percentage, or lab work percentage, is less than 55%, you may not receive a passing grade for this course.

Incomplete grades will only be given for extenuating circumstances; for example, verified illness or legitimate emergencies. If an incomplete is given all exams and lab work prior to the incomplete are still counted in your grade, only material that has not yet been completed can be made-up in the future. You must be passing the course to receive an incomplete grade.

Provided below is a table of the assignments for the class, split up between lecture assignments and lab assignments. All relevant course materials will be uploaded to the Canvas website.

Lecture Assignment	Points	Percent
Student Welcome Questionnaire	5.0	0.5
Homework	100	10.0
7 In-class quizzes (drop the lowest)	75	7.5
Midterm 1	100	10.0
Midterm 2	100	10.0
Midterm 3	100	10.0
Final Exam	150	15.0
Lecture Total	**630**	**63.0**

Class Total	**1000**	**100.0**

Lab Assignment	Points	Percent
Chemical Lab Safety Sheet	6.0	0.6
Measurements Prelab	6.0	0.6
Measurements Lab Quiz	5.0	0.5
Measurements Data	5.0	0.5
Measurements Report	12.0	1.2
Nomenclature Wkst (out of class)	10.0	1.0
Hydrate Prelab	6.0	0.6
Hydrate Lab Quiz	5.0	0.5
Hydrate Data	5.0	0.5
Hydrate Report	12.0	1.2
Precipitation Prelab	6.0	0.6
Precipitation Data	5.0	0.5
Precipitation Report	12.0	1.2
Types of Reactions Prelab	6.0	0.6
Types of Reactions Data	5.0	0.5
Types of Reactions Report	12.0	1.2
Conductivity Prelab	6.0	0.6
Conductivity Lab Quiz	5.0	0.5
Conductivity Data	5.0	0.5
Conductivity Report	12.0	1.2
Acid/Base Titration Prelab	6.0	0.6
Acid/Base Titration Lab Quiz	5.0	0.5
Acid/Base Titration Data	5.0	0.5
Acid/Base Titration Report	12.0	1.2
Calorimetry Prelab	6.0	0.6
Calorimetry Lab Quiz	5.0	0.5
Calorimetry Data	5.0	0.5
Calorimetry Report	12.0	1.2
Redox Titration Prelab	6.0	0.6
Redox Titration Lab Quiz	5.0	0.5
Redox Titration Data	5.0	0.5
Redox Titration Report	12.0	1.2
Line Spectra Prelab	6.0	0.6
Line Spectra Lab Quiz	5.0	0.5
Line Spectra Data	5.0	0.5
Line Spectra Report	12.0	1.2
Molecular Model Worksheet	12.0	1.2
Lab Final	100.0	10.0
Lab Total	**370**	**37.0**

4. The Lecture and Lecture Assignments

Lecture Description: This class covers chapters 1-4 and 6-11 from the textbook. My general philosophy towards lecture is that I am looking to give a deep description of the concepts as well as a through review of the associated math. This means I will spend a significant amount of time in lecture describing the atomic dynamics as well as going over calculations.

Lecture Assignments

a) Student Welcome Questionnaire: To become better acquainted with you and provide the best overall instructions possible, I have created a google form with a set of questions for you to answer worth **5 points**. My idea is that a strong relationship (and understanding of background) with mutual respect allows for communication and learning to be facilitated. Knowing about you early on allows for this relationship to be built. The assignment will become available on the first day of class.

b) Homework: Homework assignments are worth 10% of the overall grade and are given through the online platform Aktiv. There are a total of 10 chapters covered, so each chapter assignment will be about 1%. Scoring is on accuracy and overall completion with a score binning system I will discuss in class. I will discuss how to subscribe to and utilize this platform on the first day of class. Doing all of the listed problems is highly recommended and represents the minimum needed to practice the topics. You are strongly advised to complete posted worksheets and problems found in your textbook.

c) Weekly in-class quizzes: A 10-minute quiz will be given once a week (on Wednesdays) to test basic comprehension and ensure you are keeping up with course material. Problems you find on quizzes are generally going to be less complex/challenging compared to full-length midterm exams. There will be NO makeup or online quizzes (exempting illness related absence). Each quiz is worth 12.5 points. Seven quizzes will be administered and you will be able to drop your lowest quiz score. If you miss more than one quiz due to illness, we can discuss the allotment of quiz points towards the final exam.

d) In-class Midterms and Final Exam: I aim to give all exams in person, health permitting. Travel is not considered an excused absence, so please make your travel plans accordingly. Midterm exams will be held on Wednesdays. The in-person final exam will be comprehensive but will have an emphasis on chapters 10 and 11.

Exam 1	**Exam 2**	**Exam 3**	**Final Exam**
Wednesday Jan 25th	Wednesday Feb 22nd	Wednesday Mar 15th	**Monday Mar 27th 11:30 – 1:30**

Quizzes on Fridays when there isn't an exam.

If you are unable to take a quiz or midterm in person due to illness or other non-travel-related reasons, you may request to allocate the points for that quiz or midterm onto the final exam by email as soon as possible, preferably before I administer the quiz or midterm to your classmates. For example, if you miss the first midterm, your final exam will be worth 100 + 150 = 250 points out of the 1000 possible. If you miss both midterms, the final will be worth 350 points (35% of your grade), so try to stay healthy but rest assured that you will not receive a zero on an exam or quiz due to illness

Regrade policy: Regrades will be accepted within one week of the day when the exam is returned to the class as a whole. Concerns must be submitted in writing. Regrading is only done in response to a particular (and valid) concern in the initial grading of the exam. Upon submission, I reserve the right to regrade the whole exam, not just those questions of concern. If the error is simple in totaling points, I will make the correction without a regrade.

5. What about this lab component?

A passing grade in the lab section is required in order to pass the entire course. That is, even if you receive an A in all of your lecture components but fail the lab section, you will fail the entire course.

1) Laboratory attendance is mandatory. However, if you are feeling unwell, you are encouraged to **stay home**. While it is not possible to make up the lab specifically, there will be ways to make up the points so ensure that you put your health first before worrying about the assignment you'll miss.

2) Dress code for lab: Please note that the final dress code has been established for all students, staff, and faculty in laboratories in the chem department. Failure to meet these requirements will result in having the leave the laboratory section until the deficiencies have been addressed.
   - A t-shirt is the minimum coverage required for the upper body
   - Long pants are required
   - Closed-toe and closed-heel shoes are required
   - Ankles must be covered with pants, socks, or shoes (bring an extra pair of long socks to lab)
   - Safety splash goggles are required

Lab Assignments (Specific details below apply to Section 32189)

There will be a total of 11 lab-based exercises this quarter that will loosely correspond to the topics we are covering in lecture. All of the labs but two will have the same general set of assignments. For the two exceptions, which I will call **hands-on learning labs** you will only have to attend the lab period and complete the associated worksheet (these days don't involve any chemicals). These labs are the Nomenclature lab (which we will be doing outside of class) and the Molecular Models lab. All other labs will follow the format below:

Step 1: The first thing to do to prepare for lab is to *read the entire experiment*. It is essential to become familiar with the experimental design and procedures before starting with the lab work, and this starts with a read-through of the methods. The lab documents can be found on the De Anza chemistry website as well as on our Canvas website under "files".

Step 2: Once you have familiarized yourself with the lab, the next step is to write a **prelab** that is worth **6 points**. Your prelab will consist of seven parts, which I will outline on the first day of lab. In short, these parts are: Purpose, Background, List of Reagents, Safety, Waste, Diagram of Experiment, Data Collected. A completed prelab is required before you may begin an experiment and can either be physically shown to me or uploaded onto Canvas. We will discuss this further in lab.

Step 3: At the *beginning* of the lab period, there will be a quiz to test how well the procedure has been read and understood, worth **5 points**. This quiz will take only about 10 minutes, and you can reference your prelab and lab notebook during the quiz.

Step 4: After the quiz, I will give an introduction to the lab that includes a discussion of the theory behind the experiment as well as a walkthrough of the harder aspects of the procedure. Missing this time will result in a loss of points and may prevent you from performing the experiment that day.

Step 5: After performing the experiment, take a picture of your data and observations. Please use tables with appropriate headings with units included and the correct number of significant figures. Neatness is also key – if you cross out data values, do so neatly and indicate the new measurement taken. This data will be uploaded to Canvas under the appropriate assignment.

Step 6: With he collected data, you will need to perform calculations and follow-up questions and turn them in to Canvas for **12 points**. Tthis will be completing the rest of the packet that is posted to our Canvas website – providing final values and answering a few conceptual questions relating to the lab. Often, this will include a few questions that go beyond what is part of the experiment as posted to the De Anza chemistry website, so keep this in mind. We will usually have part of a lab period, or even a whole lab period, dedicated to helping with these calculations.

Lab Final: The lab final will test your understanding of the theories utilized in lab sections this quarter as well as the calculations implemented to yield meaningful results. What this means is that you can expect questions to appear that look similar to those on the lab reports and worksheets. For this exam you will be able to use your lab notebook and any notes you take in lab, so keeping a detailed notebook can help with the exam. The exam will take place during the last week of class and is worth **12 points**. No working with chemicals will be required.

6. Some Guidance on Studying and Success:

CHEM 1A is a fast-paced class with a variety of material, which build upon each other. To perform your best, make sure you stay on top of the material from the very beginning. It will become really hard to catch up later in the quarter. To excel in this class:

1. **Familiarize yourself with the material to be covered before attending lecture**. In practice, this can just be reading the section in the textbook, reviewing the lecture slides, or even glancing at the homework. At this time, don't concern yourself with fully understanding the material, but instead the "broad strokes". This first contact will enable you to use the lecture time to organize and understand what is being presented without feeling overwhelmed.

2. **Attend lectures**! I will emphasize the most essential aspects of the material and place it into context for you to best understand. In the least, attending lecture gives you a sense of my approach to the material and what I'll use as a focus on exams.

3. **Don't only copy words from the slides during lecture**. Since I will post pdfs of the lecture slides before class, you will not need to copy down everything on the presentation.

   In fact, furiously copying down everything on the slide is less helpful than writing down what I am saying and/or what you were thinking during a particular slide.

   It is to your benefit to print these blank lecture notes or annotate them using your computer. If you prefer to just use your notebook, I suggest accompanying your notes with the slide numbers to organize them. Lecture slides and the practice problems we do in class serve as a very good tool for studying.

4. **Complete all homework problems**. Extensive practice is the best way to ensure concept mastery. The more you practice, the more comfortable you will be, and the better you will perform on exams. Beyond assigned homework problems, you are encouraged to do in-chapter problems, end of the chapter problems, and additional worksheets posted with keys. Sometimes questions form the homework or worksheet might show up on exams.

5. **Find a study buddy**. Having someone to cross-check answers and discuss ambiguities will be tremendously encouraging.

6. **Get help when you need it**. If you are having difficulty with a topic, please do not hesitate to ask questions in class or attend office hours (that is what they are there for!). There are plenty of resources, including myself, for aiding in material comprehension, but it all starts with you making an effort to get this help.

7. Other Course Policies:

Resources: Academic support can be found at the Learning Resources Division https://www.deanza.edu/learningresources/. Information about tutoring can be found at the Math Science and Technology Resource Center https://www.deanza.edu/studentsuccess/mstrc/

Academic Integrity: By enrolling in classes at De Anza College, you are agreeing to the academic integrity policy and are held to all standards. Specifics can be found at https://www.deanza.edu/studenthandbook/academic-integrity.html.

Cheating during an exam/quiz or copying/using work other than your own for assignments will result in a 0 for the entire assignment, regardless of what percentage of the work is from cheating.

Worse than a 0 on an exam, I am required to report such incidents to the disciplinary committee, who will make a note of the incident on your transcript, which then becomes visible to 4 year colleges upon reviewing your transfer application.

Disability Service Support: De Anza is committed to providing support for all students. If you have specific physical, psychiatric, or learning disabilities and require accommodations, please let me know early in the quarter so that your learning needs may be appropriately met. For more information, visit Disability Service Support at https://www.deanza.edu/dss/

Classroom Conduct: I want to be very clear that this class is a place where everyone can feel safe to be themselves and to learn at their own pace. It is important to me that you feel comfortable to ask questions, and I hope you all will help me create a supportive atmosphere.

Health: Life at college can get very complicated. You may sometimes feel overwhelmed, lost, experience stress, anxiety or depression, or struggle with relationship difficulties. Many of these issues are very common and can be effectively addressed with a little help. Psychological Services students cope with difficult emotions and life stressors. Psychological Services is staffed by experienced, professional psychologists and counselors, who are attuned to the needs of college students. The services are FREE and completely confidential. One of the main goals from De Anza and PsychServices is to make it okay to ask for help and reduce the stigma of receiving support. Find out more on our Psychological Services website at https://www.deanza.edu/psychologicalservices/

Academic Concerns: If you are concerned with your progress in this class, please contact me so that we can find solutions together.

8. Tentative Lecture Schedule

Day	Date	Chapter	Lecture Topic	Week	Quiz
M	1/9	Ch. 1	Syllabus, units, sig figs, Scientific Method	1	
W	1/11	Ch. 2	Matter, isotopes, naming compounds		
M	1/16		MLK Day - NO CLASS	2	**Quiz 1**
W	1/18	Ch. 3	Moles, molecular formula, stoichiometry		
M	1/23	Ch. 3 & 4	Limiting reagent, types of reactions		
W	**Jan 25th**	**Exam**	**Midterm 1 - Chapters 1 - 3**	**3**	
M	1/30	Ch. 4	Types of reactions and equilibrium	4	**Quiz 2**
W	2/1	Ch. 7	Light, atomic spectra, wave-particle duality		
M	2/6	Ch. 7	Quantum nature of atom	5	**Quiz 3**
W	2/8	Ch. 8	Electron configuration and quantum numbers		
M	2/13	Ch. 8	Perioidc trends - radii, IE, EA, nuclear charge	6	**Quiz 4**
W	2/15	Ch. 9	Chemical bonding		
M	2/20		Presidents Day - NO CLASS		
W	**Feb 22nd**	**Exam**	**Midterm 2 - Chapters 4, 7, 8**	**7**	
M	2/27	Ch. 9 & 6	Electronegativity, bond energy, and thermo	8	**Quiz 5**
W	3/1	Ch. 6	Thermodynamics, enthalpy, and calorimetry		
M	3/6	Ch. 6 & 10	Hess's Law, heat of reaction, and Lewis structure	9	**Quiz 6**
W	3/8	Ch. 10	VSEPR and molecular shape		
M	3/13	Ch. 10	Molecular polarity and electron geometry		
W	**Mar 15th**	**Exam**	**Midterm 3 - Chapters 6, 9**	**10**	
M	3/20	Ch. 11	Valence bond theory and hybridization	11	**Quiz 7**
W	3/22	Ch. 11	Orbital overlap and MO Theory		

CUMULATIVE FINAL EXAM will be held in S32 (To be confirmed)
on Monday March 27th 11:30 - 1:30

Other Important Class Dates

Saturday, 1/21: Last day to add
Sunday, 1/22: Last day to drop w/ Refund
Sunday, 1/22: Last day to drop w/o W
Friday, 3/03: Last day to drop w/ W
Monday, 3/27: Final Exam

9. Tentative Lab Schedule

WEEK OF	WEEK	MONDAY	WEDNESDAY
1/8/2023	**1**	CHECK-IN	MEASUREMENT
1/15/2023	**2**	**MARTIN LUTHER KING'S DAY**	HYDRATE (1)
1/22/2023	**3**	HYDRATE (2)	PRECIPITATION (1)
1/29/2023	**4**	PRECIPITATION (2)	PRECIPITATION (3)
2/5/2023	**5**	TYPES OF REACTIONS (1)	TYPES OF REACTIONS (2)
2/12/2023	**6**	CONDUCTIVITY (1) (VERNIER)	CONDUCTIVITY (2) (VERNIER)
2/19/2023	**7**	**PRESIDENT'S DAY**	ACID-BASE TITRATION (1)
2/26/2023	**8**	ACID-BASE TITRATION (2)	CALORIMETRY (1) (VERNIER)
3/5/2023	**9**	CALORIMETRY (2) (VERNIER)	REDOX TITRATION (1)
3/12/2023	**10**	REDOX TITRATION (2)	LINE SPECTRA
3/19/2023	**11**	MOLECULAR MODEL	CHECK-OUT
3/26/2023	**12**	FINALS	FINALS

Lab Safety/Preparedness

Maintaining safety when performing experiments is a primary concern. There are many hazards associated with chemistry labs, so it is essential to recognize these hazards and understand that with proper techniques, the risk drops significantly. There are a few very simple steps students should take to execute safe lab techniques.

First, always wear personal protective equipment (PPE) when performing lab experiments. Such items include, but are not limited to, safety goggles, long pants, sleeved shirts, and closed-toe shoes. **All of this safety equipment must remain on until you complete the experiment, including cleanup**. A detailed list containing safe lab procedures and general practices is given on the next page and must be reviewed and signed before starting experiments.

Second, read the lab procedure BEFORE executing the lab procedure. Notes, facts, or some recognition of the hazards is required for the prelab to ensure the section on safety has been read. Reading the procedure ahead of time and knowing what tasks are at hand will also help the experiment go smoothly.

Finally, listen carefully to the directions provided by the instructor. Many techniques can be performed safely and easily with the proper technique but become a safety hazard when performed improperly

What follows is a list from the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

From the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all Chemistry faculty:

1) Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from student drawers, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.

2) Shoes that completely enclose the foot are to be worn at all times; NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab

3) Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: ankle-length clothing must be worn at all times

4) Hair reaching the top of the shoulders must be tied back securely

5) Loose clothing must be constrained

6) Wearing "...jewelry such as rings, bracelets, and wristwatches in the laboratory..." should be discouraged to prevent "...chemical seepage in between the jewelry and skin...".

7) Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture

8) Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture

9) Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.

10) Students are required to know the locations of the eyewash stations, emergency shower, and all exits

11) Students may not be in the lab without an instructor being present

12) Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.

13) Except for soapy or clear rinse water from washing glassware, NO CHEMICALS MAY BE POURED INTO THE SINKS; all remaining chemicals from an experiment must be poured into the waste bottle provided.

14) Students are required to follow the De Anza College Code of Conduct at all times while in lab: “horseplay”, yelling, offensive language, or any behavior that could startle or frighten another student is not allowed during lab;

15) Strongly recommended: Wear Nitrile gloves while performing lab work; wear a chemically resistant lab coat or lab apron; wear shoes made of leather or polymeric leather substitute.

By signing below, I, _____,

First Name Family Name

acknowledge that I fully understand and agree to abide by the laboratory safety rules listed above. Further, I acknowledge that my failure to abide by these rules will result in my being dropped from this chemistry class immediately.

_____ _____

Signature Date

Student Learning Outcome(s):

*Identify and explain trends in the periodic table.

*Construct balanced reaction equations and illustrate principles of stoichiometry.

*Apply the first law of thermodynamics to chemical reactions.

Office Hours:

M	02:00 PM	04:00 PM	In-Person	TBD - Discussed in Class
T	10:00 AM	12:00 PM	Zoom	