## Office Hours:
Attendance at office hours is NOT MANDATORY. However, I am happy to meet with you if you would like to ask questions or discuss anything about the course. Visit the link provided in Canvas to schedule a time to meet at your convenience.

Office hours will be held via Zoom. Upon scheduling an appointment, you will be sent a Zoom link to my personal meeting room. Please also check out the office hours offered by the TA and UTF for CHEM 1220.

### Required Materials:
- Scientific Calculator

### Prerequisite
MATH 1050 or higher; CHEM 1210

### Course description
Chemistry 1220 is the second of a two-semester sequence of general chemistry for students in the physical and biological sciences and engineering.

### Computer Requirements
It is required that you have a computer with a high speed internet connection. Your computer must also have the Google chrome browser, a webcam, and a microphone if you wish to take your proctored exams with the Proctorio browser extension.

### Canvas
All lectures (pre-recorded), course materials, and graded assignments (quizzes and exams) will be available through Canvas. For questions regarding your Canvas account or password, or any other technical support, please refer to the information below.

- [http://canvas.usu.edu](http://canvas.usu.edu)
  - Your username is your A#, and your password is your global password (the same one you use for Banner or Aggiemail).
- For Canvas, passwords, or any other computer-related technical support, please refer to the information below.
  - 435 797-4357 (797-HELP)
  - 877 878-8325
  - [http://it.usu.edu](http://it.usu.edu)
  - servicedesk@usu.edu

### Course Communication
Course announcements will be made via the class Canvas page. **You are responsible for checking Canvas at least once a day for new announcements!** An even better approach would be to set up Canvas announcements to go straight to your email. Please feel free to email me with questions! I try to maintain a 24-hour response time during the week and a 48 to 72-hour response time on weekends. Often, I can respond much faster, however you should not plan to send last minute questions regarding quizzes or exams (ie. at 10pm on the evening that a quiz is due) and expect a rapid response.

Office hours are offered by appointment for your convenience if you would like to discuss anything (virtually) face-to-face. Please visit the link provided in Canvas to schedule an appointment.
### Piazza

For academic questions, I would prefer that you post your questions on Piazza (quiz questions are allowed). You will most likely also get a quicker response this way. The link to Piazza is located on the Canvas navigation list. Piazza is a free, online system where students can ask and answer questions. Not only will I be able to answer your questions, but TA’s and other students will be able to offer answers as well. (I always double check that answers provided by students are correct and will provide clarification if needed). **Before you send a question, double check that someone else has not already asked it on Piazza, you may have an answer already waiting for you!** You also have the option to post anonymously on Piazza, although please be aware that as an instructor I will be able to see your identity. It is expected that your communication on Piazza will be respectful and considerate, no harassment of any kind will be tolerated. Piazza is not the forum to discuss personal information. If you have personal concerns, please email me directly.

### Course Navigation

The course is divided into 10 chapters (Chapter 14-17, 19-24). For each chapter you should (1) download and print the provided lecture notes (or access them digitally in a way that will allow you to add your own notes from the lecture). You should then (2) watch the appropriate lectures and (3) work the assigned self test problems (available on the Course Schedule). Both the PDF solutions and recorded solutions (linked on Canvas) are available for the chapter self test problems. After mastering the chapter concepts, you should then (4) take the graded chapter quiz. After submission, (5) review your graded quiz submission and then repeat for the remaining four attempts. If at any time during this process you have questions, please reach out either on Piazza or directly to myself, the UTF for the course, the SI instructor or the TA. In addition to office hours, the TA will also hold some structured review sessions each week. Please see details for dates and times on the Canvas home page.

Due dates for watching the course lectures are provided to help keep you on pace with the course, however all lectures will be available during the entirety of the semester. **Due dates for quizzes and exams are firm and late submissions will not be accepted.**

Please refer to the Course Schedule and Assignments pages on Canvas for due dates.

### Supplemental Instruction

The supplemental instruction leader will hold structured review sessions twice a week that review the material from the current week’s lectures via Zoom. Dates/times and contact information will be announced on Canvas. You may attend any SI sessions that you wish. The SI instructor for this course is:

Nicole Felt

### Undergraduate Teaching Fellow

The UTF for this course will hold weekly office hours via Zoom. Dates/times and contact information will be announced on Canvas. The UTF for this course is:

Kami Morgan

### Graduate Teaching Assistants

The teaching assistant will hold both structured review sessions and open office hours. Dates/times and contact information will be provided on Canvas. The TA for CHEM 1220 is:

Annalee Hovinga

### Chapter Self Test Problems

There is a set of self test problems for each chapter covered in CHEM 1220. The self tests are available as a Canvas practice quiz and as a PDF. Both written and recorded solutions are
available for each self test (linked on Canvas). Suggested homework problems are listed as an
accompaniment to each lecture on the course schedule.
Mastery of problems solving skills is essential for your success in CHEM 1220. You should
work all self test problems and refer to the provided solutions as necessary.

| Online Quizzes | Three midterm exams (100 points each) will be must be taken using Proctorio or in the
USU testing center (testing.usu.edu) during a three day availability period. Please make
sure that you read the instructions on using Proctorio in the student guide. The exams
are based on material covered in class and closely match the difficulty level and content
of the practice exams, chapter self tests, and graded on line quizzes. You are strongly
encouraged to work the on-line chapter self tests, take the quizzes the full five times,
and work the practice exams posted in canvas and given in previous years as part of
your exam preparation.
There are three practice exams available for each midterm exam. Practice exams are
available digitally in Canvas and as PDFs. Written solutions are provided for all
practice exams, and recorded solutions are provided for the first version of each practice
exam.

| Midterm Exams (graded) | After the exam availability window closes, and before detailed exam results are
released, you will have two days to retake the same exam on your own computer in an
open book format to increase your exam score. The point value for the exam retake
will be determined by the class average on the exam. If the exam average is 73% or
higher, the exam retake will be worth a maximum of two points added to your original
exam score. If the exam average is less than 73%, the retake will be worth “75 minus
the exam average”. The points you receive on the retake will be added to your original
exam score to increase your exam score by that number. For example, if the average on
exam 1 is 69%, the retake will be worth \((75 - 69) = 6\) points total. If your original score
was 74/100 (74%), and you retake the exam and score 5.6/6 (93.3%), the 5.6 points will
be added to your original score giving you 79.6/100. If you score 100/100 and retake the
exam and score 6/6, your score will be adjusted to 106/100.

| Midterm exam second chance (retake) to raises your midterm score | An optional “make-up exam”, covering all of the material covered on midterms 1-3 and
worth 100 points, will be offered during the time interval indicated on the syllabus. If
you score higher on this exam than on your lowest of three in-class midterms, the score
will replace the lowest midterm score. If you score lower on the make-up exam than on

On line make-up exam (can substitute for lowest midterm |
**Chemistry 1220 Syllabus, Spring 2021, Dr. Melissa Kofoed**

| **Final exam** | The comprehensive final exam (200 points) will be given in the USU testing center or available to take via Proctorio. The exam may be taken anytime during finals week. The final exam will consist of both a “new material” section (34 questions, material from chapters 14-17, 19-22) and a “comprehensive portion” (26 questions, material from chapters 23-24). |
| **Course Flexibility** | Life happens. In order to provide some flexibility, the following course provisions (as detailed in other locations in the syllabus) are available to all students:  
1. Your lowest quiz score is dropped and the best 10 of 11 quizzes (1 pre-test quiz and 10 chapter quizzes) count towards your final grade. In addition, a comprehensive make-up quiz will also be offered at the end of the semester that can replace your next lowest quiz score or missed quiz.  
2. Your lowest MIDTERM exam score may be dropped and replaced with your score on the comprehensive makeup exam. Your total of three midterms, OR two best midterm exam scores + comprehensive make up exam score count towards your final grade. (Note: You CANNOT drop your final exam score.)  
3. An additional eight points of extra credit can be earned by completing the embedded “quiz” questions within the recorded lectures. These questions can only be answered, and points can only be earned by accessing the lectures from either the Course Schedule or the Assignments page. If you have issues that prevent you from accessing and streaming the lectures via either of these methods, please email me. The extra credit will be calculated as follows:  
   - (# of questions answered correctly/total # of lecture questions) x 8 |
| **Grading** | A total of 600 points are possible in Chem. 1220 and are distributed as follows:  
   - Total of 3 midterms, or best two midterms and the on-line make-up exam..............300 pts.  
   - On-line Quizzes (best 10 of 11 @ 10 points each) .................................................................100 pts.  
   - Comprehensive Final Exam .................................................................200 pts.  
   
Total points.........................................................................................................................600 points  

When this course is taught face to face, I offer students the opportunity to earn an additional 8 points of extra credit by attending class and answering iClicker questions throughout the lecture. In order to provide you with the same opportunity, I have embedded questions within each lecture. These questions can only be answered, and points can only be earned by accessing the lectures from either the Course Schedule or the Assignments page. If you have issues that prevent you from accessing and streaming the lectures via either of these methods, please email me. The extra credit points can be earned as follows:  
   - (# of questions answered correctly/total # of lecture questions) x 8  

In terms of final assignment of grades, you are guaranteed the following grades if your final class percentage lies within the indicated ranges:
This is the grading scheme currently set in Canvas with the guaranteed breaks. Note that percentages **DO NOT ROUND** to these values: for example, a 92.99% average will not round to 93.0, and will result in an “A-” grade. To earn an “A”, your average must be 93.00% or better. If the overall class average on all assignments at the conclusion of the semester is less than 73%, the percentage cuts for the various grades may shift lower than the breaks shown at left. In other words, better grade may be assigned for lower percentages than those indicated above, a scenario that is to your favor. However, the percentages will never shift higher than the above, so you are assured the indicated or a higher grade, depending on the class average at the conclusion of the course. **In an effort to be fair and consistent to all students, Grade breaks will not be shifted based on individual student petitions.**

* This syllabus serves as a statement of intent and serves and an agreement between the instructor and the student. Every effort will be made to avoid changes to the syllabus, but the possibility exists that unforeseen events could make changes to the syllabus necessary.
### Provisions:
The administration of Chem 1220 will adhere strictly to the academic policies outlined in the most recent USU General Catalog, which can be found here:
- [http://catalog.usu.edu/content.php?catoid=12&navoid=3139](http://catalog.usu.edu/content.php?catoid=12&navoid=3139)
- [http://www.usu.edu/provost/faculty-life/syllabus.cfm](http://www.usu.edu/provost/faculty-life/syllabus.cfm)

### Course Assessment
Students in this class are expected to develop proficiency in the principles listed on the class schedule and the attached “Learning Objectives” list. Questions provided on midterms, quizzes, and through the use of the embedded quizzes in lectures will be used to assess your understanding of these principles. The formats to be used for assessment will include instructor-designed questions. Please note that assessment is a tool used by the Department of Chemistry and Biochemistry to improve the quality of instruction and proficiency of our students. Your grade will be based on your performance on the assignments indicated above, some of which will be used for course assessment.

*In accordance with the Americans with Disabilities Act, reasonable accommodations will be provided for all persons with disabilities in order to ensure equal participation in Chem 1220. In cooperation with the Disability Resource Center, reasonable accommodation will be provided for students with disabilities. Please meet with the instructor during the first week of class to make arrangements. Alternative format print materials, large print, audio, diskette or Braille, will be available through the Disability Resource Center.*
IDEA Objectives
1. Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories).
2. Learning to apply course material (to improve thinking, problem solving, and decisions).
3. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course.
4. Learning appropriate methods for collection, analyzing, and interpreting numerical information.

Chemistry 1220 Learning Objectives

Describe reaction rates in terms of zero, 1st, 2nd and 3rd order processes
Describe reaction rates as a function of temperature
Predict reaction half-lives given initial conditions
Differentiate between the plots of 1st order and 2nd order reactions
Describe the action of catalysis on a chemical reaction
Describe reactions in terms of elementary steps and rate-determining steps
Write equilibrium constant expressions
Perform calculations of concentrations, pressures using $K_{eq}$ information
Predict the direction of a reaction using the reaction quotient
Explain Le Chatelier's Principle
Cite essential definitions of acids and bases
Utilize the autoionization of water to define pH and pOH, $K_w$, $pK_w$
Employ $K_a$, $K_b$ values to calculate pH, pOH of solutions of weak acids, weak bases, and salts
Describe chemical factors that contribute to the strength of acids and bases
Apply concepts of the Common Ion effect to design and construct acid/base buffer systems
Calculate acid/base titration curves and predict end-point conditions
Describe and apply $K_{sp}$ values to determine solubility of inorganic solids
Describe the precipitation and separation of ions utilizing $K_{sp}$ information
Describe and apply the concepts of entropy to chemical reactions
Use Gibbs's Free Energy to predict chemical equilibrium
Balance chemical reactions that involve changes in oxidation states
Express oxidation/reduction in terms of half reactions
Describe voltaic cells and calculate potentials using standard reduction potentials
Predict the spontaneity of oxidation/reduction reactions
Employ the Nernst Equation to calculate cell potentials and chemical concentrations
Describe the essential reactions related to common battery systems and fuel cells in use today
Describe the chemical reactions of corrosion
Describe and differentiate between fundamental types of radioactivity and radioactive processes
Predict nuclear stability based on proton/neutron ratios
Apply 1st order kinetics for radioactive decay
Compare the energetic and mass aspects of nuclear fission and nuclear fusion
Describe the fundamental aspects of the reactivity of non-metal elements
Identify the major chemical processes for purifying iron, steel, aluminum, copper, and sodium
Describe the structure and bonding in simple coordination complexes of transition metals like Fe, Cu
Predict simple electronic configurations for transition metal ions using the periodic table
Predict magnetism using simple models of Crystal Field Theory
Discuss how the color of transition metal complexes is related to d-orbital splitting
Identify and draw the structure of hydrocarbon alkanes, alkenes, alkynes, and aromatics
Identify and draw the organic functional groups ethers, aldehydes, ketones, acids, esters, and amides
Identify the chemical structures of amino acids, polypeptides, carbohydrates, sugars, fats and nucleic acids