# General Chemistry for Scientists and Engineers II

# CHEM 1412

**This syllabus may need to be changed or corrected over the course of the semester. You will be notified when any changes are made by email or eLC announcements.**

# Course Overview

## Instructor

Dr. Jessica Jensen

Chemistry Annex, 407F

Email: jmjensen@uga.edu  
Office Phone: 706-542-0393

**Student Drop-In Hours (for content questions):**

TBA

**One-On-One Office Hours (for discussion of personal matters, course standing, etc.):**

By appointment – email for availability

# Course Co- and Pre-requisites

Pre-requisite: CHEM 1211, 1311H, or 1411; Co-requisite: CHEM 1412L

## Course Welcome

Welcome to General Chemistry for Scientists and Engineers II! This course is designed toprovide the foundational knowledge needed for scientists in fields like chemistry, materials, biochemistry, and biochemical engineering. In this course, we will build our skills and knowledge through active learning. As scientists, we rely on the larger body of scientific research, and educational research shows active learning is the best way to learn and retain concepts and skills. We will engage individually and as groups inproblem-solving activities to develop deep understanding and foster a scientific community. We will also try to develop a growth mindset – another thing research shows fosters student success. People with a growth mindset believe they can learn with enough effort – even when it’s hard – which is supported both by our available educational research and by my own experience teaching chemistry for over a decade.

It will not be all work and no play! Where possible, assignments will prioritize real life applications, choice, and creativity. It will be hard work sometimes, but engaged students will achieve a deepunderstanding of foundational chemical concepts that will help them throughout their career. I will also be there for you at every step, providing feedback, guidance, and a personal cheering section. I’m so excited to share my knowledge and love of chemistry with you and to support you as you become scientists. Never hesitate to reach out with questions or concerns. I understand that life can throw up roadblocks sometimes, both big and small. While there are some things I can’t change, like content expectations, I am here to help you navigate both the field of chemistry and campus bureaucracy. Together, I know we will achieve great things!

## Course Description

This is the second semester of an in-depth, two-part course which covers thermodynamics, kinetics, equilibria, acid-base chemistry, electrochemistry, nuclear chemistry, and the application of skills to solving problems involving multi-step mathematical sequences.

## Course Learning Outcomes

At the completion of the course, you will be able to:

## Demonstrate the ability to solve scientific problems by following logical procedures based on well-established scientific principles.

## Relate microscopic theories to macroscopic observations using chemical principles to explain observable phenomena.

## Illustrate the principles of kinetics and thermodynamics as applied to rates and equilibrium positions of chemical reactions.

## Use quantitative measures of solution concentration in describing acid-base, solubility, and electrochemical principles of aqueous solutions.

## Interpret the value of logarithmic functions in the determination of rate constants; half-lives for radioactive isotopes; and solution concentrations of specific analytes (i.e., pH measurements to determine hydrogen ion concentrations).

## Analyze nuclear processes such as radioactivity, fission, and fusion in terms of kinetic and thermodynamic principles.

## Course Topical Outline

Chapter 11: Intermolecular Forces and Liquids

Chapter 12: The Solid State

Chapter 14: Chemical Kinetics: The Rates of Chemical Reactions

Chapter 18: Principles of Chemical Reactivity: Entropy and Free Energy

Chapter 13: Solutions and Their Behavior

Chapter 15: Principles of Chemical Reactivity: Equilibrium

Chapter 16: Principles of Chemical Reactivity: The Chemistry of Acids and Bases

Chapter 17: Principles of Chemical Reactivity: Other Aspects of Aqueous Equilibria

Chapter 19: Principles of Chemical Reactivity: Electron Transfer Reactions

Chapter 20: Nuclear Chemistry

## Required Materials

An internet connected device like a laptop, phone, or tablet is required for the course to access TopHat, a polling website free to UGA students and Gradescope, also free for student use. Additionally, you will need any non-programmable, scientific calculator such as the Ti-3x series or the Casio ClassWiz series (The TI-30XS Multiview is recommended). Programmable or graphing calculators (eg. TI-83 or similar) are not permitted. *Chemistry and Chemical Reactivity, 11th Edition* (John C. Kotz, Paul M. Treichel, John R. Townsend, David Treichel) is an optional textbook for the course. I may reference tables in the text and there are some good practice problems at the end of chapters. Feel free to find the lowest price option!

## What About Lab (CHEM 1412L)?

CHEM 1412 and 1412L are individual courses that are administered and graded separately. You will receive separate and independent grades for these two courses. However, CHEM 1412 and 1412L must be taken concurrently. You should be registered for both lecture and lab. Dr. Norton (dnorton2@uga.edu) is the faculty member in charge of the lab.

## Communication

I will communicate with the class in two ways: email and announcements on the course eLC site. You may login to eLC at http://elc.uga.edu using your UGA myID and password. I highly recommend that you forward your eLC e-mail to your preferred e-mail address. Remember that official communication is through eLC e-mail and/or UGA mail, and you are expected to check your email and eLC at least once every business day. I will never expect you to check emails on weekends, as I don’t either - I think we all deserve a built-in break from classes.

### Email Etiquette

I teach multiple courses and sometimes receive many student emails per day. To ensure your email is answered as quickly as possible:

* Check the syllabus and eLC for an answer before emailing – it will definitely be faster for you if your answer is already there, and you’re not waiting on me!
* Don’t send messages through eLC – email me at JMJensen@uga.edu. eLC messages don’t nest and make it difficult to keep track of conversations, so I will ask you to resend any messages as emails if you forget.
* Please give me 2 *business* days (MTWRF) to answer emails before following up. I often answer within a day, but I sometimes receive a large volume of emails.
* Tone is sometimes hard to read over email, so make sure your emails are written in a professional manner. Open with a greeting; keep the body coherent, concise, and cordial; and close with the name you preferred to be called.
* Include your course number and CRN or meeting time in every email, as I teach multiple courses.
* I have found it is often difficult to answer homework or concept questions via email. I will do my best, but I may direct you to my office hours for numerous or hard to answer questions.

# Course Requirements and Grading

## Course Assignments

### Pre-Class Assignments: 10% Overall Grade

Readings or videos will be posted for you to complete before the first class meeting of the week. These will generally include embedded questions to check your understanding of the video or reading. While these questions are graded on accuracy, I will drop three of these assignments to account for technical difficulties, illness, or anything that may occasionally affect your score.

**Academic Honesty Expectations:** You may work in groups on pre-class assignments while consulting outside resources; however, each of you must do your own problems.

### In-Class Activities: 10% Overall Grade

We will have in-class activities every day, ranging from TopHat questions to practice problems to case studies and more. You must be present to earn in-class activity points, but I know life happens, and we don’t always make it to class for a variety of reasons. I will drop six days of in-class activities at the end of the semester to account for any absences.

**Academic Honesty Expectations:** You must respond to your own questions and be present in class to attempt the activities. If you respond to class activities while you are not present in the classroom, a report will be made to the Office of Academic Honesty.

### Homework: 10% Overall Grade

We will have homework assignments each week. These may be practice questions, mock exams, or assignments that will help you dive further into the world of chemistry. Homework for the upcoming week will be announced no later than Fridays either in-class or on eLC. In addition to lectures, we will have a weekly in-person recitation session that is intended to provide help with homework. Recitations will have Chemistry Learning Assistants (CLAs), other chemistry majors who have done well in general chemistry, in attendance, and they can help you with your work.

On exam weeks, we will have homework assignments called readiness quizzes. Readiness quizzes are *timed* mock exams designed to test your understanding of the course materials and simulate exam conditions. The points allocated to these quizzes are low that you can stumble on the readiness quiz and not severely hurt your grade in CHEM 1412. It is much better to find out what you’re struggling with on the readiness quiz instead of the exam! These will be available as quizzes in eLC and require LockDown browser. The timer on these cannot be stopped or reset, so make sure not to open them before you’re ready to try the quiz! Three attempts will be given on each quiz, with the best attempt counting toward your final grade.

The three lowest scoring homework assignments will be dropped to account for any absences or technical difficulties. Gradescope assignments will also have a built-in no-penalty 24-hour grace period before the assignment closes to submissions.

**Academic Honesty Expectations:** You may generally consult with other students on homework and use outside resources, but you must submit your own work. AI may be used for *help* depending on the assignment, but it should not play a larger role in completing your assignment than another student might. When in doubt, ask me before using AI, and I’d be happy to talk about your specific use. You are expected to work on your own when completing thereadiness quizzes. You should not use *any* outside resources, including your own notes. This is your opportunity to see what you need to work on before the exam! Don’t share or post readiness quiz questions while the quiz is open.

### Exam Projects: 0 – 10% Overall Grade

Exam Projects are group projects that are meant to provide you with a different way to showcase your knowledge outside of exams. During the semester, we will have four of these projects, each worth 2.5% of your course grade, based on a pre-approved lists of learning objectives that students often struggle with. Groups can create short videos, podcasts, papers, interactive presentations, infographics or a project of your own design.

Topic proposals will be due the week of the Monday of the exam week. If you would like to move the weight of that content project to the upcoming exam, that will also be allowed. That will make the midterm exam worth 12.5% of the final grade, and no project will be required. Groups that want to make a project will submit a proposal with the learning objectives their project covers and a description of what they will create. Each project must cover one learning objective per person, but every group member must work on every learning objective in some way. For each project, you will give group feedback that will be taken into consideration for the final grade of each group member. Science is generally a group project, so we are going to practice the soft skills that will make you successful in your future career!

**Academic Honesty Expectations:** You should work with your group and use outside resources on chapter projects. AI may be used for brainstorming or writing *help* depending on the project, but it should not play a larger role in completing your project than another student might. When in doubt, ask me before using AI, and I’d be happy to talk about your specific use.

### Midterm Exams: 40 – 50% Overall Grade

Four 90-minute examinations will be given on Thursday evenings. Each exam will be worth 10% of your overall grade (12.5% if not doing that exam project), adding up to 40% at a minimum and 50% at a maximum. Because we can continue learning and developing skills even after an exam, your exam grade with the lowest percentage score will be replaced with your final exam percentage value if it is higher.

Department policy is that makeup exams require official documentation (e.g. a doctor’s note) of an unavoidable absence *specifically* on exam day. You must email me as soon as you know you will be absent, at least 24 hours in advance except in case of sudden emergencies. I will work with you to reschedule your exam as soon as possible so that your classmates can get their own scores back in a timely manner.

Because this is a course with evening exams, there are a few rules that you should be familiar with before entering the exam room. These rules will be enforced by the exam proctors.

* Personal belongings are to be left at the front or sides of the room and electronic devices turned off *before* you take a seat.
* You are not allowed to have any electronic device, including a cell phone, smart watch, or ear buds, on your person during the exam.  All electronic devices must be left with your belongings or the proctors at the front of the room. Any student found with an electronic device will be referred to the Academic Honesty office. If you need your cell phone for things like monitoring medical devices, please sign up with Accessibility and Testing as soon as possible!
* You should make use of bathroom facilities before you enter the exam room. Once in the exam room you cannot leave until you have finished the exam. If you have a medical reason this is not possible, please sign up with Accessibility and Testing.
* Bring your ID - we can accept any government issued *photo* ID but your UGA ID is preferred.
* You may only use a non-graphing calculator (see Required Materials) with the back cover removed and left in your backpack.
* You will not be given extra time to bubble or fill in answers after time is called, so make sure all answers have been transferred to the answer sheet before time has elapsed. Continuing to write beyond the allotted time will result in a zero on the exam.

### Final Exam: 20% Overall Grade

The final exam will be the (multiple-choice) Second-Term General Chemistry Exam from the American Chemical Society (ACS) Examinations Institute. Because we have to purchase each exam from ACS, you will not be allowed to write on this exam. Doing so will result in a fee of $25 and a hold being placed on your account – you will be reminded several times of this policy as the exam comes up so you can avoid this fee. If your percentage grade on this exam is higher than your lowest midterm exam percentage grade, the final exam percentage grade will replace it.

#### **Exam Schedule:**

Exam 1 Thursday, 6:30-8:00 PM January 29, 2026

Exam 2 Thursday, 6:30-8:00 PM February 26, 2026

Exam 3 Thursday, 6:30-8:00 PM March 26, 2026

Exam 4 Thursday, 6:30-8:00 PM April 16, 2026

Final Exam Thursday, 7:00-8:50 PM April 30, 2026

## Course Grades

Course grades in CHEM 1412 will be calculated based on these components:

|  |  |
| --- | --- |
| **Assignment** | **Percentage** |
| Midterm Exams (10% each) | 40 – 50% |
| Final Exam (ACS) | 20% |
| Chapter Projects (2.5% each) | 0 – 10% |
| Pre-Class Assignments | 10% |
| Homework | 10% |
| In-Class Activities | 10% |

Your final grade will be based on the scale below:

A = ≥ 90%

A - = 88 – 89.9%

B+ = 86 – 87.9%

B = 80 – 85.9%

B- = 78 – 79.9%

C+ = 75 – 77.9%

C = 65 – 74.9%

D = 50 – 64.9%

F = ≤ 49.9%

Course letter grades are delivered via eLC prior to being entered into Athena to check for accuracy.

### Regrade Requests

Make sure you are keeping up with your returned work – I encourage you to look at graded work as soon as possible to learn from it. To prevent a rush at the end of the semester, requests for regrades on any assignment, including exams, must be submitted no later than one week after the score or key is posted, whichever is later.

Regrade requests for anything on eLC or TopHat should be emailed to me, citing the assignment and question. Regrade requests for anything on Gradescope must be submitted using the regrade request function on Gradescope. I’m always happy to fix errors, just make sure that you are looking at returned work within the regrade window!

# Policies and Procedures

## This is a Core IMPACTS course that is part of the STEM area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students’ broad academic and career goals.

This course should direct students toward a broad Orienting Question:

* How do I ask scientific questions or use data, mathematics, or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcome:

* Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems, and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

* Inquiry and Analysis
* Problem-Solving
* Teamwork

## Withdrawal Policy

The last day to withdraw from CHEM 1412 is **Thursday April 9, 2026**. A grade of ‘W’ is assigned to all withdrawals made prior to the withdrawal deadline. You can withdraw yourself through Athena - go to the withdrawal section of Athena and follow the instructions. Remember that CHEM 1412 and CHEM 1412L are corequisite courses. To remain in CHEM 1412L while withdrawing from CHEM 1412, you must have completed a substantial majority of the work in both courses. After the withdrawal deadline, the only available withdrawal is in the case of an approved hardship withdrawal that is authorized by the Office of Student Care and Outreach (http://reg.uga.edu/policies/withdrawals).

Before withdrawal, I always suggest consulting with me or your academic advisor or both. We both want you to do what’s best for you and can help point you to resources or give you perspectives you may not be seeing.

## Incomplete Policy

Per university policy, an incomplete grade, “I”, may be assigned to students that have finished most of CHEM 1412 with a passing grade but are unable to complete all university coursework during the current semester due to unforeseen personal and/or medical circumstances. I cannot assign an incomplete grade to students who are not passing the course at the time of the request or who do not have major extenuating circumstances.

## Disability Accommodations

If you plan to request accommodations for a disability, please register with Accessibility and Testing. Accessibility and Testing can be reached by visiting Clark Howell Hall, by calling 706-542-8719 (voice) or 706-542-8778 (TTY), or by visiting http://accessibility.uga.edu. Accommodations can sometimes take a few weeks or months to get in place, so please start the process as soon as possible. Accessibility and Testing discourages instructors from granting accommodations outside their official process, so I will need official accommodations on file to grant them, except in the cases of acute illness or injury. And I want you to have the support you need to succeed!

## Academic Honesty

UGA Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at honesty.uga.edu.

As a University of Georgia student, you have agreed to abide by the University’s academic honesty policy, “A Culture of Honesty,” and the Student Honor Code. All academic work must meet the standards described in “A Culture of Honesty” found at: www.uga.edu/honesty. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to me before you start working on them.

# FERPA Notice

The Federal Family Educational Rights and Privacy Act (FERPA) grants students certain information privacy rights. See the registrar’s explanation at reg.uga.edu/ general-information/ferpa/ FERPA allows disclosure of directory information (name, address, telephone, email, date of birth, place of birth, major, activities, degrees, awards, prior schools), unless requested in a written letter to the registrar.

# UGA Well-Being Resources

UGA Well-being Resources promote student success by cultivating a culture that supports a more active, healthy, and engaged student community.

Anyone needing assistance is encouraged to contact Student Care & Outreach (SCO) in the Division of Student Affairs at 706-542-8479 or visit sco.uga.edu. Student Care & Outreach helps students navigate difficult circumstances by connecting them with the most appropriate resources or services. They also administer the Embark@UGA program which supports students experiencing, or who have experienced, homelessness, foster care, or housing insecurity.

UGA provides both clinical and non-clinical options to support student well-being and mental health, any time, any place. Whether on campus, or studying from home or abroad, UGA Well-being Resources are here to help.

* Well-being Resources: well-being.uga.edu
* Student Care and Outreach: sco.uga.edu
* University Health Center: healthcenter.uga.edu
* Counseling and Psychiatric Services: caps.uga.edu or CAPS 24/7 crisis support at 706-542-2273
* Health Promotion/ Fontaine Center: healthpromotion.uga.edu
* Accessibility & Testing: https://accessibility.uga.edu/

Additional information, including free digital well-being resources, can be accessed through the UGA app or by visiting https://well-being.uga.edu.