South Plains College
Common Course Syllabus: CHEM 1412
Revised January 2026

Department: Science

Discipline: Chemistry

Course Number: CHEM 1412

Course Title: General Chemistry II

Instructor:

Dr. Laci Alexander
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Office Hours: Monday: 8:30 am – 9:30 am
Tuesday: 8:30 am – 9:30 am; 2 pm – 3 pm
Wednesday: 8:30 am – 9:30 am
Thursday: 8:30 am – 9:30 am; 2 pm – 3 pm
Friday: 9 am – 11 am
You may also make an appointment for office hours using the following link:
Calendly Office Hours

Available Formats: conventional

Campuses: Levelland

Course Description: Chemical equilibrium; phase diagrams and spectrometry; acid-base concepts; thermodynamics; kinetics; electrochemistry; nuclear chemistry; an introduction to organic chemistry and descriptive inorganic chemistry. Basic laboratory experiments supporting theoretical principles presented in lecture; introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports.

Prerequisite: A grade of "C" or better in CHEM 1411.

Credit: 4 **Lecture:** 3 **Lab:** 3

Supplies:

Safety Goggles – Required, obtained from bookstore
Calculator – Required, must be scientific, **CELL PHONES NOT ALLOWED**

This course partially satisfies a Core Curriculum Requirement:
Life and Physical Sciences Foundational Component Area (030)

Core Curriculum Objectives addressed:

- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions
- **Teamwork**—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcomes:

From Lecture:

1. Physical Properties of Solutions
    a. Understand the definition of a solution and how a solution forms from a molecular point of view; to learn the different types of solutions
    b. Learn the various methods of calculating the concentration of a solution and the corresponding units that go along with each method
    c. Learn how temperature affects the solubilities of substances and how pressure affects the solubility of gases in solution
    d. Understand the colligative properties of solutions and how to calculate changes in the freezing point and boiling point of a solution
2. Chemical Kinetics
    a. Learn what the rate of a reaction means, how to determine it, and how to write the rate law for reactions
    b. Understand the relation between reactant concentration and time, and how to calculate concentrations and times
    c. Study the definition of activation energy and understand how rate constants are dependent on temperature
    d. Discover how to determine a likely reaction mechanism
3. Chemical Equilibrium
    a. Discover what chemical equilibrium is and study how to write an equilibrium expression using the law of mass action
    b. Study about homogeneous and heterogeneous equilibria and how these affect the equilibrium expression
    c. Discover the difference between the equilibrium constant and the reaction quotient and how these are used to predict the direction a reaction will proceed to reach equilibrium
    d. Calculate the equilibrium constant using given equilibrium concentrations and calculate equilibrium concentrations given the equilibrium constant
    e. Learn what factors affect equilibrium
4. Acids and Bases
    a. Discover the Bronsted-Lowry and Arrhenius definitions of acids and bases as well as how to determine which compound is the acid or base
    b. Learn the acid-base properties of water and how the ion-product constant of water is determined and used
    c. Study pH and how it is calculated
    d. Distinguish between strong acids/bases and weak acids/bases and learn how to calculate the pH of these acids and bases using ionization constants when necessary

    e. Understand the acid-base properties of salts and how to calculate the pH of a salt solution
5. Acid-Base Equilibria and Solubility Equilibria
    a. Learn about the common ion effect and how the Henderson-Hasselbalch equation can be used to calculate the pH of solutions that have a common ion
    b. Discover buffers including their definition, calculation of their pH, and the preparation of one
    c. Study about acid-base titrations and the calculation of pH at different points during a titration as well as learning about indicators that can be used during a titration
    d. Understand solubility equilibria and distinguish between solubility and molar solubility
    e. Perform calculations involving the solubility product constant and study how the common ion effect affects solubility
6. Thermodynamics
    a. Discover what a spontaneous process is
    b. Learn about entropy including the second and third law of thermodynamics and to perform entropy calculations
    c. Understand the meaning of Gibbs Free Energy, perform Gibbs Free Energy calculations and to learn how the free energy change affects spontaneity
    d. Discover how free energy and chemical equilibrium are related

7. Electrochemistry
    a. Learn about redox reactions and how to balance them using the half-reaction method
    b. Learn about voltaic cells and how to write cell diagrams
    c. Study about standard reduction potentials including their use in calculating cell voltages
    d. Explore the spontaneity of redox reactions and how standard cell voltages, equilibrium constants, and standard free energy changes are related
    e. Understand what affect concentration has on cell voltage and perform related calculations
    f. Study about corrosion
8. Nuclear Chemistry
    a. Distinguish between nuclear and chemical reactions
    b. Study the types of particles involved in nuclear reactions as well as how to use them to balance nuclear reactions
    c. Study about nuclear stability and how this affects radioactive decay
    d. Learn about natural radioactivity and the kinetics of these processes
    e. Distinguish between nuclear transmutation, nuclear fission, and nuclear fusion

From Lab:

1. Safety Orientation
    a. Demonstrate the fundamentals of laboratory safety including the use and location of safety equipment
2. Calculations involving solutions

   a. Demonstrate knowledge of calculations involving solutions
3. Freezing point depression
   a. Perform or view a demonstration of a freezing point depression experiment including calculations of molar mass with data collected
4. Molar mass by the boiling point method
   a. Perform or view a demonstration of an experiment that uses boiling point elevation data to determine molar mass
5. Kinetics
   a. Perform or view a demonstration of an experiment that employs the use of spectrometer data to determine the order of a reaction
6. Acids and Bases
   a. Demonstrate knowledge of acids and bases by calculation of their pH's
7. Weak acid ionization constant
   a. Perform or view a demonstration of an experiment that uses titration data collected from pH meters to calculate the ionization constant of a weak acid
8. Common ion effect
   a. Perform or view a demonstration of an experiment that uses titration data to prove the common ion effect

Student Learning Outcomes Assessment: 2-3 questions from each semester will be randomly selected from the regular exams. These will pertain to a pre-selected topic and will be used to determine the extent of improvement that the students have gained during the semester.

Course Evaluation

- **Major Exams**
  - There will be four major exams throughout the semester, each worth 100 points (with opportunities for bonus points).
  - To keep everyone on track, make-up exams will not be offered, so please plan ahead and communicate with me early if conflicts arise. See policy below for specific examples for make-up exams.
  - You may use a calculator (after clearing its memory and showing me before the exam begins).
  - A reference/formula sheet will also be provided or permitted so you can focus on applying concepts rather than memorizing every detail.
- **Final Exam**
  - The final exam is comprehensive and optional. Think of it as an extra opportunity—you can use it to replace your lowest exam grade if it helps your overall average.
  - The final exam is open note, so your own well-organized notes will be a valuable tool.
  - Finals are scheduled by the college, and you'll take it at the assigned time.

Remember: Exams are not meant to trick you—they're designed to highlight what you've learned and how you're growing as a problem solver. With consistent effort, preparation, and the resources provided, you'll be ready to succeed.

Reference Sheets

- For each major exam, You may use one 3×5 notecard (both sides) for Exams 1–4.
- Cards may be handwritten or typed.
- Allowed content includes formulas, constants, and definitions or other instructor-approved information.
- Prohibited content: No worked examples from class notes, worksheets, practice problems, or online sources. No questions should be written on the notecard.
- Violations:
    - Unauthorized content will result in point deductions based on the severity of the infraction.
    - Any bonus points for that exam will also be forfeited.
    - Inclusion of unapproved material constitutes academic dishonesty and will be subject to the cheating policies outlined in this syllabus.

Exam Make-Ups

- **Lecture Exams:** Make-up exams are only available if you notify me *in advance*. Please don't wait until the next class meeting to ask. Once an exam has been graded and returned, no make-ups will be given. This means any make-up must be completed **before the following class period**.
- **Final Exam:** Final exam times are set by the college, not by me. If you must miss the final due to serious, unavoidable circumstances, contact me immediately so we can make arrangements. A final exam make-up must be completed by **3:00 PM on Thursday of final exam week** or it will be recorded as a zero.
- In rare, extreme situations (e.g., hospitalization) where taking the final is impossible, you may be excused and your grade will be based on existing coursework—unless the college has other requirements. Documentation will be required in such cases.

Life happens, and communication is key. If you encounter an emergency, let me know as soon as possible so we can work together on the best solution.

Laboratory Policies, Safety, and Good Practices

This is where chemistry truly comes alive through discovery, experimentation, and hands-on learning. The lab can be both exciting and challenging, and maintaining a culture of safety, teamwork, and preparation ensures that everyone has a successful experience.

Proper Laboratory Dress

Safety starts before you even step into the lab. You must arrive properly dressed to participate:

- Safety glasses and gloves are required at all times.
- Closed-toed shoes, long pants, and a shirt with sleeves are mandatory.
- Long hair must be tied back and secured.
- Students who arrive without proper attire will not be allowed to perform the experiment and will receive a zero for that lab activity.

Food, Drinks, and Personal Items

- Food, drinks (including water bottles), and gum are not allowed in the lab. They should be stored in your bag or on the instructor's desk before lab begins.

- Personal belongings should be placed near your station but out of aisles and off the benchtop to prevent spills and clutter.

Lab Assignment Submission Policy

All **lab assignments** will be submitted **individually through Blackboard**, even though the experiments are performed in groups. Each student is responsible for completing and submitting their own lab work for grading.

During the lab period, students should carefully record **all observations, data, and results** needed to answer the questions provided in the Blackboard lab assignment.

It is **the student's responsibility** to ensure they have gathered all necessary information during the experiment — including measurements, calculations, and observations — before leaving the lab.

After the lab session, students must complete and submit their lab assignment on Blackboard **by the posted due date**. Late submissions will **not be accepted** under any circumstances.

⚠️ **Important:**

- Missing or incomplete data due to inattention during lab will result in lost points on the assignment.
- If a student is absent for a lab, they will receive a **zero** for that lab assignment (no make-ups are allowed).

Proper documentation, careful data collection, and timely submission are essential to success in the laboratory portion of this course.

General Safety Guidelines

- Know where the eyewash station, safety shower, fire extinguisher, and first aid kit are located.
- Report any spills, breaks, or injuries immediately—no matter how small.
- Never work alone or perform unauthorized experiments.
- Keep your workspace organized and uncluttered.
- Respect your classmates—no horseplay, distractions, or phone use during experiments.
- Wash your hands before leaving the lab.

***Before You Enter the Lab* — Quick Safety Checklist**

Use this quick list to make sure you're ready for lab each day:

☐ Safety glasses on
☐ Gloves ready
☐ Closed-toed shoes
☐ Long pants and sleeves
☐ Hair tied back
☐ No food or drinks
☐ Lab notebook and pre-lab read

Remember: Lab success comes from preparation, teamwork, and safety. When we take these guidelines seriously, we create an environment where everyone can explore, learn, and thrive.

Homework assignments are designed to **help you prepare for exams and strengthen your understanding** of the material.

- Homework will be completed on **Blackboard**.
- Each chapter will include assigned problems that reinforce lecture topics.
- Homework grades will be automatically recorded in the Blackboard gradebook.
- Staying consistent with homework is the best way to ensure success on exams.

Attendance Policy

Your success in this course depends heavily on your participation and engagement in class.

- Attendance will be taken at **random class meetings**, usually within the first 30 minutes.
- **If you leave early**, you will be counted **absent** for the day. This includes missing lab. You must be present for lecture AND lab to receive 100% attendance for that day.
- You are allowed up to **4 absences total**. After the 4th absence, you may be **dropped from the course with an "F."**

If you must miss class, please **communicate with me beforehand** whenever possible. Life happens — and communication helps us handle it the right way.

If you decide to withdraw from the course, you must officially do so **through the Registrar's Office by the drop date.** If you stop attending without formally withdrawing, you will be administratively dropped with a grade of "F."

Dropped Grades

To support your success, the following lowest grades will automatically be dropped at the end of the semester:

- **One lowest homework grade**
- **One lowest lab grade**
- **One lowest exam grade** (this may include the final exam)

Use these as safety nets — not as excuses to skip work. Staying consistent will make your final grade much stronger.

Technology Policy

Technology can be a great tool — but it can also be a big distraction.

- **Cell phones and laptops** may be collected and held during lecture or lab if they become disruptive to you, your classmates, or the instructor.
- Exceptions will be made only for students with approved accommodations through **Special Services**.

To help you stay focused, I recommend putting your devices on **silent** and keeping them off the lab bench during experiments.

Grading Breakdown

Category	Percentage	Notes
Exams	**50%**	**Four major exams + comprehensive final (lowest exam dropped)**
Homework	**20%**	**Lowest grade dropped**
Laboratory	**15%**	**Lowest grade dropped**
Discussions/Journals	**10%**	**Lowest grade dropped**
Attendance	**5%**	

Academic Integrity: Plagiarism & Cheating Policy

Honesty and integrity are at the heart of learning — especially in science. Every assignment, lab report, and exam is designed to help *you* grow as a student and thinker. Cutting corners not only hurts your grade, but also your own understanding of the material.

You are expected to complete your own work on all quizzes, exams, assignments, and projects.

Any form of plagiarism or cheating will result in:

- An automatic zero (0) for the assignment or exam involved.
- Further consequences, including a possible "F" in the course, if the situation warrants.

If a student is caught cheating on a Major Exam, they will receive a zero that cannot be replaced by the Final Exam option — that score will stand.

What Counts as Plagiarism

Plagiarism means using someone else's words, data, or ideas as your own. This includes (but is not limited to):

1. Turning in a paper that was purchased, borrowed, or downloaded from another person or website.
2. Copying and pasting information from books, articles, or online sources without proper citation.
3. Using direct quotes (three or more words) without quotation marks and proper credit.
4. Missing in-text citations for ideas or data that are not your own.

When in doubt — cite it! If you're unsure whether something needs a citation, ask me before submitting your work.

What Counts as Cheating

Cheating means gaining an unfair advantage on any form of academic work. Examples include:

1. Stealing or sharing exam content before it's given.
2. Using unauthorized materials (notes, phones, apps, or the internet) during exams or quizzes.
3. Taking an exam for someone else or having someone take yours.
4. Copying another student's answers on homework, quizzes, or exams.
5. Altering grades or submitting altered work for regrading.
6. Taking photos of tests, test answers, or another student's paper.
7. Rewriting another student's work during peer editing so that it's no longer their original writing.

Bottom line: Academic integrity is about building trust — between you, your classmates, and me as your instructor. Mistakes can be forgiven, but dishonesty cannot. Protect your work, your integrity, and your learning.

Communication & Email Policy

Good communication helps everything run smoothly — especially in a course as fast-paced as Organic Chemistry! If you have a question, concern, or just need clarification, please don't hesitate to reach out.

How to Contact Me:

- **Email:** lalexander@southplainscollege.edu
- **Please do not use Blackboard messages.** They can easily get lost or overlooked. Always email through your **official SPC email account** for the fastest response.

Response Time:

- Emails received **Monday–Thursday (8:00 AM–3:45 PM)** will be answered within **48 hours.**
- Emails received after **3:45 PM on Thursday** or over a **weekend/holiday** will be answered within **48 hours of the next class day** after campus reopens.

Tip: If it's Friday evening, don't panic if you don't hear back right away — I'll respond as soon as the new week begins!

Email Etiquette & Online Conduct

Professional communication is part of your growth as a student — and as a future scientist or professional. When emailing or posting online (including Blackboard discussions or class group messages), please:

- Use a **respectful, courteous tone** — kindness goes a long way.
- Avoid profanity, sarcasm, or personal remarks.
- Keep messages clear and focused on the topic or question at hand.
- Sign your email with your **full name and course section** to help me respond quickly.
- If asking a question about a specific homework question please **include that question in the email.**

Our classroom — in person and online — should always be a space where everyone feels respected and able to learn. Disruptive or disrespectful behavior, in any form, will result in appropriate disciplinary action.

Remember: clear, polite communication helps me help you faster!

Technology Requirements

Because this course includes online components and digital assignments, it's important that you have access to reliable technology throughout the semester. Being prepared with the right tools will help you avoid unnecessary stress and stay successful in the course.

You will need:

1. **A reliable laptop or desktop computer** (not just a phone or tablet) with:
    - A stable **internet connection**
    - Adequate **storage space** for downloading and saving files
    - An updated **web browser** (Chrome recommended)
2. **A working webcam and microphone** for **Honorlock or other proctored exams.**
    - You are responsible for making sure your device and webcam are working before testing days.

    - We likely will not have proctored exams, but if it is needed please have the right equipment.
3. **The ability to create and submit PDFs.**
    - You'll need to know how to **take clear photos or scans of assignments** and **convert them to a single PDF file** before uploading to Blackboard.
    - Free scanning apps such as *Adobe Scan, Microsoft Lens,* or *CamScanner* work great for this purpose.
4. **Access to your SPC email and Blackboard** on your device.
    - Check both regularly for announcements, assignments, and important updates.

Tip: Technology issues happen — plan ahead and don't wait until the last minute to submit work or test your equipment.

If you experience ongoing technology difficulties, please contact the **SPC Help Desk** for assistance as soon as possible. Reliable technology is part of your responsibility in completing this course successfully.

Recommended Software & Apps

The following tools and programs will make your work in Organic Chemistry II smoother and more efficient. Most are **free or available through SPC resources.**

For Coursework & Organization

- **Microsoft Office (Word, Excel, PowerPoint)** – Available free through your SPC student account. Use Word for lab reports, Excel for data analysis, and PowerPoint for presentations.
- **OneDrive** – Great for saving backups of your work and sharing files securely.

For Chemistry-Specific Work

- **MolView (web-based, free)** – Helpful for drawing molecular structures and reaction mechanisms.
- **Organic Chemistry Model Kit App** *(or physical kit)* – Useful for visualizing stereochemistry and conformations.
    - **A physical kit** can be used during an exam, but an app may not be used.

For File Submissions

- **Adobe Scan**, **Microsoft Lens**, or **CamScanner** – Easy, free apps to scan handwritten work or lab reports into a single PDF file.
- **Adobe Acrobat Reader** – Lets you open, review, and combine PDF files for submission.

For Communication & Collaboration

- **SPC Email** – Check daily for announcements and communication from your instructor.
- **Blackboard App** – Handy for checking grades, assignment due dates, and course materials on the go (though you should still complete exams and uploads from a computer).

Tip: Download and test these tools early in the semester so you're confident using them before assignments and exams begin.

INSTRUCTIONAL POLICIES AND RESPONSIBILITIES

For information regarding official South Plains College statements about intellectual exchange, disabilities, non-discrimination, Title IX Pregnancy Accommodations, CARE Team, and Campus Concealed Carry, please visit https://www.southplainscollege.edu/syllabusstatements/.