

South Plains College
Common Course Syllabus: CHEM 1406
Revised 08/20/2026

Department: Science

Discipline: Chemistry

Course Number: CHEM 1406

Course Section: 003

Course Title: Introductory Chemistry I

Available Formats: Face to face

Campuses: Levelland

Instructor: Dr. Bangshing Wang. Office S117B. **Email:** bwang@southplainscollege.edu

Office Hours: Monday:	9:00 am ~ 11:00 am
Tuesday:	8:30 am ~ 9:30 am & 1:30 pm ~ 2:00 pm
Wednesday:	9:00 am ~ 11:00 am
Thursday:	8:30 am ~ 9:30 am & 1:30 pm ~ 2:00 pm
Friday:	9:30 am ~ 10:30 am

Course Description: CHEM1406: INTRODUCTORY CHEMISTRY 1. (4:3:3) Survey course introducing chemistry. Topics may include inorganic, organic, biochemistry, food/physiological chemistry, and environmental/consumer chemistry. Designed for allied health students and for students who are not science majors. Basic laboratory experiments supporting theoretical principles presented in lecture; introduction of the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports. Note: This course may not be substituted for CHEM 1411.

Prerequisite: None

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

Textbook: N/A

Supplies: Required

- CHEM1406 Lab Manual. (On Blackboard)
- Safety glasses/goggles.
- Five maroon colored scantrons-*Apperson Form 29240* (SPC Bookstore)
- Scientific calculator. Usage of cell phones *WILL NOT BE* allowed on exam!

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. Convert units of measure and demonstrate dimensional analysis skills
2. Define the fundamental properties of matter and classify matter, compounds, and chemical reactions.
3. Determine the basic nuclear and electronic structure of atoms.
4. Distinguish between ionic and covalent compounds and name the different compounds.
5. Identify trends in chemical and physical properties of the elements using the periodic table.
6. Determine the role of energy in physical and chemical reactions.
7. Use the mole concept to determine the number of atoms, moles, grams, and solve elementary stoichiometry-based calculations.
8. Determine the concentrations of solutions using percentage and molarity designations.
9. Use various characteristics of a solution to identify it as an acid or base.
10. Identify and name various organic compounds.
11. Identify and explain the functions of carbohydrates, lipids, and proteins.

From Lab:

1. Use basic apparatus and apply experimental methodologies used in the chemistry laboratory.
2. Demonstrate safe and proper handling of laboratory equipment and chemicals.
3. Conduct basic laboratory experiments with proper laboratory techniques.
4. Make careful and accurate experimental observations.

5. Relate physical observations and measurements to theoretical principles.
6. Interpret laboratory results and experimental data, and reach logical conclusions.
7. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.
8. Design fundamental experiments involving principles of chemistry.
9. Identify appropriate sources of information for conducting laboratory experiments involving principles of chemistry.

Student Learning Outcomes Assessment:

Few topics/questions from the exams will be selected to assess the students learning outcomes at the end of semester.

Course Evaluation/Grading Policy:

LECTURE EXAMS and FINAL EXAM: There will be FOUR lecture exams and ONE final exam, they will be taken in class; these exams will cover the materials in the lecture notes, and the schedule of the exams are on the course schedule. Exams will be in a multiple-choice format. Only the materials discussed in the lecture notes will be on the exam and you will have designated time to finish the exam. *There will be no make-ups for lecture exams unless a student is hospitalized. This will require documentation to be provided to the Dean of Students and/or the Associate Director of Health & Wellness. All other missed lecture exams will receive a grade of zero.*

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|-------------------------------------|------------|
| • Lecture exam 1 (Chapters 1 and 2) | 100 points |
| • Lecture exam 2 (Chapters 3 and 4) | 100 points |
| • Lecture exam 3 (Chapters 5 and 6) | 100 points |
| • Lecture exam 4 (Chapters 7 and 8) | 100 points |
| • Final exam (Chapter 9 and 10) | 100 points |

Note: one lowest exam grade will be dropped at the end of the semester.

The materials scheduled for each lecture exam by subject to change, this change will be announced in advance if necessary.

EXAM PRACTICE REVIEW: There will be FIVE exam practice assignments, sole purpose of exam practice review is to help prepare for the exam and it does not count towards the total grade. Highly recommend students spend quality time with the exam review as it will prepare you for the exam.

LAB ASSIGNMENTS: Lab reports and lab practices will be collected for grading at the end of each lab experiment day. Students will complete the lab assignments for grading before leaving the lab. *Each lab assignment will be worth 10 points, there will be total of 20 Lab experiment and lab practices, which will add up to 150 points of your final grade. Four lowest lab grades will be dropped at the end of semester.*

The laboratory portion of this class will be comprised of topic discussion, practice worksheets and lab experiments. The lab portion of this course will consist of group work to perform lab experiments. *There will be no make-up labs for the missed lab; students will receive ZERO for the lab section if missed.*

Grading based on percentage:

A = 90 – 100%

B = 80 – 89%

C = 70 – 79%

D = 60 – 69%

F = below 60%

Grade distribution:

Total exams: 400 points

Total Labs: 150 points

Total Possible point: 550 points

Attendance Policy:

It is vitally important that you plan your time and study lectures notes and attend all the laboratory experiments in order to do well in this course. ***Attendance will be taken until the census date (first 12 days of class). Students who enroll in a course but have “Never Attended” by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records.***

Students are expected to attend all classes in order to be successful in a course. The student may be administratively withdrawn from the course when absences become excessive as defined in the course syllabus. When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student’s responsibility to complete work missed within a reasonable period of time as determined by the instructor. Students are officially enrolled in all courses for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first-class meeting.

It is the student’s responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

Plagiarism and Cheating: Students are expected to do their own work on all projects, quizzes, assignments, examinations, and papers. Failure to comply with this policy will result in a grade of ZERO for the assignment and can result in an F for the course if circumstances warrant.

Plagiarism violations include, but are not limited to, the following:

1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:

1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning. Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

Email: When you have questions, problems, or comments, you can e-mail me directly to bwang@southplainscollege.edu. Please refrain from using the Blackboard Course Messages tool to message me. I will respond to your email in a timely manner (within 24 hours), emails received after 10:00 PM on Monday through Thursday will receive a response next morning. Emails received on Friday through Sunday will get a response usually same day email received, unless email was sent after 10:00 PM. I generally will not check my email often during the weekend, but I will reply to your email in a timely manner when I see them.

Expectations when Corresponding: Please be polite, courteous, and respectful when communicating. Do not use profanity under any circumstances. Do not write disrespectful, insulting, mean, rude, profane, insensitive, or other hurtful messages or comments under any circumstances. Failure to abide by this policy will result in the appropriate disciplinary actions.

Online Disclaimer: This is to notify you that materials you may be accessing in chat rooms, e-mails, discussion forums or unofficial web pages are not officially sponsored by the instructor or South Plains College. The United States Constitution rights of free speech apply to all members of our community regardless of the medium used. The instructor and South Plains College disclaim all liability for data, information or opinions expressed in these forums.

Minimum Computer Requirements:

1. Personal computer
2. Web Browser: Google Chrome works best
3. A high-speed internet connection
4. Microsoft Word and Microsoft PowerPoint software (a recent version)
5. Software or Program to read PDFs
6. A good soundcard and functioning speakers
7. Knowledge of how to navigate web pages and how to deal with pop-up blockers and other devices and warnings on your browser
8. Knowledge of how to download files from the internet and find them on your computer once they are downloaded
9. Knowledge of basic operations of Microsoft Word and Microsoft PowerPoint
10. Knowledge of how to view and adjust videos

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Computer Problems or Blackboard Server Problems: If a student's internet connection goes down, or a student's computer crashes or otherwise becomes inoperable for Blackboard, it is the responsibility of the student to have their internet connection and/or computer repaired as soon as possible in order to avoid getting behind in the class. While the computer and/or internet connection is being repaired, the student should seek an alternate computer. It will be the student's responsibility to find an alternate computer to avoid getting behind in the class. Internet problems and/or the crash or inoperability of a computer will not be an acceptable excuse for being late with any assignments or getting behind with the chapter modules. *It is the responsibility of the student to have a backup plan in place.* If the Blackboard server goes down, the

appropriate time extensions on any quizzes will be determined and announced by the instructor.

Logging into the Course: You are not allowed to give your user ID and/or password to anyone. You will be dropped and given an F for your final grade if someone besides you is caught logging into this course under your user ID and/or password.

For information regarding official South Plains College statements about Intellectual Exchange, Disabilities, Non-discrimination, Title IX Pregnancy Accommodations, CARE Team, and Campus Concealed Carry, COVID-19, Artificial Intelligence, please visit <https://www.southplainscollege.edu/syllabusstatements/>.

Course Schedule: CHEM1406

Week of		Monday Lecture and Lab	Wednesday Lecture and Lab
#1	08/24	Introduction to course	Chapter 1: - Scientific methods - Scientific notation - Units of Measurements - Reliability of measurement (Significant figures) Lab: Lab Safety
#2	08/31	Chapter 1 - Exact numbers - Precision and accuracy - Prefix multipliers - Dimensional analysis Lab Exp 1: Measurements	Chapter 1 - Density - Specific gravity Chapter 2: - Classification of matters - States of matter - Physical & chemical changes/properties - Temperature Scales Lab Peer 1: Unit conversion
#3	09/07	Labor Day Holiday	Chapter 2 - Fundamental of energies - Evaporation, boiling, condensation, sublimation and deposition - Specific heat capacity - Heat of fusion and heat of vaporization Lab Exp 2: Density
#4	09/14	Chapter 2 - Heat and cooling curve - Combined heat determination Lab Peer 2: Density	Exam 1 Exam correction
#5	09/21	Chapter 3: - Elements and symbols - Metals, nonmetals and metalloids - Groups, periods and common names - Atoms (Discovery, theory and structure) - Subatomic particles Lab Peer 3: Subatomic particles	Chapter 3 - Atomic numbers and mass numbers - Isotopes - Electron energy levels - Trends in periodic properties (Atom size, Ionization energy and metallic character) - Electron-dots/Lewis structures Lab Exp 3: Elements and compounds
#6	09/28	Chapter 4 - Ionic and covalent bonds - Cations and anions - Naming and writing formula for two types of ionic compounds Lab Exp 11A: Atomic Emission Spectroscopy	Chapter 4 - Polyatomic ions - Naming and writing formula ionic compounds with polyatomic ion - Molecular compounds Lab Exp4: Determining mole ratio
#7	10/05	Chapter 4 - Polar and nonpolar covalent bonds - Formation of molecular compounds - Types of bonds (Single, double and triple) - Drawing Lewis structures Lab Exp 5: Hydrates	Chapter 4 - Naming and writing formula for molecular/covalent compounds - Electronegativity and bond polarity - Nonpolar and polar bond determination - VSEPR Theory - Electron vs molecular geometry Lab Exp 13: Naming compounds

#8	10/12	Exam 2 Exam correction	Chapter 5 - Chemical quantities and reactions - Concept of mole - Avogadro's number - Chemical formula and mole - Molar mass and conversions Lab Peer 4: Molar Mass
#9	10/19	Chapter 5 - Understanding chemical equations - Balancing chemical equations - Types of chemical reactions - Concept of stoichiometry - Stoichiometry calculation using balanced chemical equation Lab Exp 6: Determining unknown acid	Chapter 5 - Limiting vs excess reactants - Percent yields - Energy in chemical reactions - Exothermic and endothermic reactions - Reaction rate, temperature, catalyst, activation energy Lab Peer 5: Stoichiometry
#10	10/26	Chapter 6 - Concept/properties of gas - Units of pressure, volume, temperature and amount - Simple gas laws: Boyles', Charles' Avogadro's and Gay-Lussacs' law Lab Exp 7: Boyles' law Lab	Chapter 6 - Combined Gas law - Ideal Gas law - STP, standard condition - Concept of molar volume - Stoichiometry using molar volume - Concepts of mixture of gases: (Dalton's Law of Partial pressure) - Kinetic molecular theory Lab Peer 6: Gas laws
#11	11/02	Exam 3 Exam correction	Chapter 7 - Concept of solutions: Solute and solvent - Formation of solutions and properties of water - Electrolytes (strong and weak) and nonelectrolyte - Solubility: Unsaturated vs saturated - Solubility Rules Lab Exp 10: Exo and Endo reaction
#12	11/09	Chapter 7 - Concentration of solutions - Percent mass, volume, mass-volume concentrations - Molarity Lab Peer 7: Concentrations	Chapter 7 - Dilution of solutions - Properties of solutions: solutions, colloids, and suspensions - Osmosis - Isotonic, hypotonic and hypertonic solutions and dialysis
#13	11/16	Chapter 8 - Arrhenius acids and bases - Naming and writing formula for binary acid and oxyacid - Naming and writing formula for bases - Bronsted-Lowry acid, base, conjugate acid and conjugate base - Strength of acids and bases Lab Exp 12: Household acids and base	Chapter 8 - Acid base equilibrium - Le Chatelier's principle - Autoionization of water, ion product constant of water, K_w - Acidic, basic and neutral solutions - Calculation relationship between, H_3O^+, OH^-, pH and pOH Lab Peer 8: pH, pOH

#14	11/23	Exam 4 Exam correction	Thanksgiving Holidays
#15	11/30	Chapter 9: - Organic vs Inorganic compounds - Naming hydrocarbons - Alkanes, alkenes and alkynes - Structural formulas: molecular, condensed, expanded, skeletal and ball and stick model - Conformations and isomers: Structural isomers - Naming cycloalkanes - Substituents on hydrocarbons - Naming and drawing hydrocarbons with substituents - Aromatic compound: benzene Lab Exp 15: Organic Models	Chapter 10 - Carbohydrates: mono, di and polysaccharides - Aldehydes and ketones - Chirality of molecules - Fischer projections: D and L notation - Haworth structures - Lipids: Fatty acids and steroids - Types of fatty acids: mono vs polyunsaturated, cis vs trans, - Waxes and triacylglycerols - Fats and oils - Phospholipids: Sphingomyelin, Cholesterol - Amino acids: polar and nonpolar - Proteins: Primary, secondary, tertiary and quaternary structures - Concepts of enzymes
#16	12/07	Final Exam 10:15am ~ 12:15pm, on Monday, Dec 7th.	

Note: Final exam time may be different from normal lecture exam time.