

CHEM 1405  
Introductory Chemistry I  
Western Texas College

**I. Basic Course Information**

- A. Lecture – 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.
- B. Lab – 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.
- C. Any required prerequisites: N/A
- D. PBL – The course is designed to make extensive use of project-based learning (PBL) activities. Students will be required to analyze real-world problems, research background information, and implement their proposed solutions to these problems. Results are communicated using lab reports that require explanations of their initial ideas, the experimental process, and the ultimate outcome.

**II. Student Learning Outcomes**

Student Learning Outcomes	COMM	CT	EQS	TW
1. Describe the scientific method.	X	X		
2. Use dimensional analysis with proper unit and significant figures.			X	
3. Determine the basic nuclear and electronic structure of atoms.	X			
4. Classify matter and compounds.	X			
5. Determine the role of energy in physical changes and chemical reactions.	X	X		
6. Use rules of nomenclature to name chemical compounds.	X	X		
7. Identify the different types of chemical bonds.	X	X		
8. Define the types and characteristics of chemical reactions.	X	X		
9. Write and balance equations.	X		X	
10. Solve stoichiometric problems.	X	X	X	
11. Identify trends in chemical and physical properties of the elements using the Periodic Table.	X	X		
12. Describe the bonding in and the shape of simple molecules and ions.	X	X		
13. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.	X		X	
14. Use basic apparatus and apply experimental methodologies used in the chemistry laboratory.		X		X
15. Demonstrate safe and proper handling of laboratory equipment and chemicals.	X			X
16. Conduct basic laboratory experiments with proper laboratory techniques.	X	X		X
17. Make careful and accurate experimental observations.	X	X	X	X
18. Relate physical observations and measurements to theoretical principles.	X	X		X
19. Interpret laboratory results and experimental data, and reach logical conclusions.	X	X	X	X

20. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.	X		X	X
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### III. Major Course Requirements

- A. 11 multiple-choice chapter quizzes
- B. 11 MasteringChemistry assignments
- C. 9 total lab assignments
- D. 1 semester project/PBL
- E. 3 non-cumulative multiple-choice semester exams
- F. 1 cumulative multiple-choice final exam

### IV. Grading Breakdown

<i>Types of Assignments</i>	<i>Proctored</i>	<i>Not Proctored</i>
Chapter Quizzes		10%
MasteringChemistry		10%
Lab	20%	
Semester Project/PBL		20%
Semester Exams	20%	
Final Exam	20%	
Total	60%	40%

### V. Testing Requirements

- A. The semester exams and final exam must be proctored by the instructor for all on-campus students. Online students must have their exams proctored by an approved testing organization. (Ask your instructor for more details.)
- B. Students are NOT allowed to use their book or notes of any kind while taking their exams.
- C. All proctored exams are timed.

### VI. Books and Other Course Materials

- A. Required Book – *Introductory Chemistry*, 6th Edition by Nivaldo J. Tro  
MasteringChemistry access required for homework  
Hardcopy with MasteringChemistry - ISBN 9780134290812  
eText with MasteringChemistry
- B. Scientific calculator required – cell phones are not allowed to be used on exams
- C. Lab Materials – Lab materials will be provided to on-campus students. Online students must purchase the required lab kit for Science Interactive: LP2820CK02, from the WTC bookstore.

### VII. Other Policies, Procedures and Important Dates

Please refer to the WTC catalog for the following:

- A. Campus Calendar

- B. Final exam schedule
- C. How to drop a class
- D. Withdrawal information
- E. Student Conduct/Academic Integrity
- F. Class Attendance
- G. Students with disabilities

### VIII. Course Content

Week #	Lab/PBL	Description	SLO
1		Chapter 1: Chemical world; scientific method; analyzing and interpreting data	1, 3, 15
	PBL Lab 1 Lab 2	Introduction to PBL and Element Sign-up Getting Started Lab Laboratory Safety Lab	
2		Chapter 2: Scientific notation; significant figures; basic units of measurement; problem solving and unit conversion; density; numerical problem-solving strategies	2
	PBL Lab 3	Element Video Summary Math and Graphing Prep Lab	
3		Chapter 3: Classifying matter: solid, liquid, and gas; composition: elements, compounds, and mixtures; physical and chemical properties; physical and chemical changes; conservation of mass; energy; energy and chemical and physical change; temperatures; heat capacity	3, 4, 5, 14, 15, 16, 17, 18, 19, 20
	Lab 4	Laboratory Techniques and Measurements Lab	
4		Chapter 4: Atomic theory; the nuclear atom; properties of protons, neutrons, and electrons; elements; periodic law and the periodic table; ions; isotopes; atomic mass	3, 4, 11
5		Exam 1	3, 4, 11
	PBL	Element Poster	
6		Chapter 5: Compounds; chemical formulas; elements and compounds; writing formulas; nomenclature: naming ionic compounds, molecular compounds, and acids; formula mass	6, 7, 14, 15, 16, 17, 18, 19, 20
	PBL Lab 5	Poster Evaluation The Mole: Conversions to Moles and Atoms Lab	
7		Chapter 6: Counting atoms; counting molecules; chemical formulas as conversion factors; mass percent composition; empirical formulas; calculating molecular formulas	2, 14, 15, 16, 17, 18, 19, 20
	Lab 6	Mass Conversions to Moles and Atoms Lab	
8		Chapter 7: Chemical reactions; chemical equation; write balanced equations; aqueous solutions and solubility; precipitation reactions; writing chemical equations for reactions in solutions; acid-base and gas evolution reactions	8, 9, 14, 15, 16, 17, 18, 19, 20
	PBL	Uses of Element Activity	

	Lab 7	Chemical Reactions Lab	
<b>9</b>		Chapter 8: Mole-to-mole conversions; mass-to-mass conversions; limiting reactants, theoretical yield, and percent yield; enthalpy	2, 10
<b>10</b>		Exam 2	
<b>11</b>		Chapter 9: Light; the electromagnetic spectrum; the Bohr model; the quantum-mechanical model; electron configurations and the periodic table; explanatory power of the quantum-mechanical model; periodic trends	3, 11, 14, 15, 16, 17, 18, 19, 20
	PBL Lab 8	Electron Configuration Activity Spectroscope and Visible Light Lab	
<b>12</b>		Chapter 10: Lewis structures of ionic compounds; covalent Lewis structures; resonance; predicting the shapes of molecules; electronegativity and polarity	3, 7, 12, 14, 15, 16, 17, 18, 19, 20
	PBL Lab 9	Lewis Structure Activity Acid-Base Chemistry Lab	
<b>13</b>		Chapter 11: Kinetic molecular theory; pressure; Boyle's law; Charles's law; combined gas law; Avogadro's law; Ideal gas law; mixtures of gases; gases in chemical reactions	10, 11
<b>14</b>		Exam 3	
<b>15</b>		Final Exam Review	
	PBL	Element Video/Animation	3, 4, 8, 11, 12
<b>16</b>		Cumulative multiple-choice final exam	

\*This schedule is subject to change at the discretion of the instructor.