Reedley College

CREDIT COURSE OUTLINE

I. COVER PAGE

(1) CHEM 10   (2) ELEMENTARY CHEMISTRY   (3) 4

Number   Title   Units

(4)	Lecture / Lab Hours:				(8)Classification:					
	Total Course Hours									
		Total Lec hours:		3.00			Degree applicable:		X	
		Total Lab hours:		3.00			Non-degree applicable:			
		Total Contact hours:		108.00			Basic skills:			
	Lec will generate _0_ hour(s) outside work.				(9)RC	Fulfills AS/AA degree requirement: (area)				
	Lab will generate _0_ hour(s) outside work.									
						General education category:				
(5)	Grading Basis:	Grading Scale Only					Area A Natural Sciences			
		Pass/No Pass option	X				Major:			
		Pass/No Pass only					Certificate of:			
(6)	Advisories:						Certificate in:			
	Eligibility for English 126				(10)CSU		Baccalaureate:		X	
					(11)Repeatable: (A course may be repeated three times)					
	Eligibility for English 125								0	
	MATH 103 - INTERMEDIATE ALGEBRA									
(7)	Pre-requisites(requires C grade or better):									
	Corequisites:									

(12) Catalog Description:
Composition of matter, physical and chemical changes, atomic and molecular structure, inorganic nomenclature, chemical formula and reaction calculations, gas laws, types of chemical bonding, solutions, net ionic equations, acid-base theories, pH, oxidation-reduction reactions, equilibrium. Recommended for students planning to take Chemistry 1A or 3A who do not have a strong background in chemistry.

II. COURSE OUTCOMES:
(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:
   I. Demonstrate a working knowledge of the periodic table in such ways as deriving inorganic chemical formulas and balanced chemical equations.
  II. Write the name of inorganic and molecular compounds from the formulas.
 III. Use dimensional analysis and stoichiometry to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass and concentration.
 IV. Apply the definition of acids and bases and understand the concept of pH.
  V. Understand basic safety procedures in the chemical laboratory and demonstrate laboratory skills in the use of the analytical balance, conducting experimentation and proper glassware handling.

III. COURSE OBJECTIVES:
(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:
   I. Write correct symbols for the elements and using the Periodic Table write correct formulas for inorganic compounds.
  II. Gain an understanding of how to identify molecular and ionic compounds and the specific bonding types that occur in these compounds.
 III. Set up and balance chemical equations.
 IV. Gain an understanding of the mole and mass calculations using the stoichiometry in the balanced equation.
  V. Identify molecular and ionic compounds.
 VI. Gain an understanding of what the ideal gas law and combined gas law is and how this can be used to calculate quantities for all the variables in the equation, such as pressure, volume, moles and temperature.
VII. Identify the names and symbols and gain a working knowledge of the most common elements on the periodic table and

demonstrate this in such ways as deriving inorganic chemical formulas and balanced chemical equations.

VIII. Learn to write the names of inorganic and molecular compounds and apply the basic rules for writing chemical formulas and demonstrate this by correctly naming and writing out chemical formulas.

IX. Use dimensional analysis to convert from the English to the metric system for measurements that are common to chemistry such as mass, volume, formula weights, denisty, linear measurements and temperature.

X. Learn to balance chemical equations, and use both molecular and net ionic forms of the equation and use stoichiometry to predict quantities of products given reactant amounts.

XI. Describe covalently bonded compounds using Lewis structures.

XII. Apply the definition of acids and bases to the understanding of pH and acid related problems.

XIII. Demonstrate safe laboratory skills by using the laboratory equipement such as analytical balance, thermometer, and safely conducting direcected experimentation by the proper use of glassware and other lab equipement.

IV. COURSE OUTLINE:

Lecture Content:

A. An Introduction to Chemistry
 1. History
 2. Relationship with other Sciences
 3. The Scientific Method

B. Standards for Measurement
 1. Mass and Weight
 2. Significant Figures
 3. Rounding Off
 4. Scientific Notation
 5. The Metric System
 6. Dimensional Analysis
 7. Temperature and Volume Measurements

C. Classification of Matter
 1. Physical States of Matter, Substances and Mixtures
 2. Names and Symbols of the Important Elements
 3. Metals, non-Metals and Metalloids
 4. Compounds

D. Properties of Matter
 1. Physical and Chemical Properties of Matter
 2. Conservation of Mass.
 3. Heat and Conservation of Energy

E. Early Atomic Theory and Structure
 1. Dalton's Atomic Theory
 2. Discovery of Ions
 3. Subatomic Particles
 4. Relationship between Atomic Number and Atomic Mass

F. Nomenclature of Inorganic Compounds
 1. Common Names and Systematic Names
 2. Binary and Ternary Compounds, Salts, Acids and Bases

G. Quantitative Composition of Compounds
 1 The Mole Concept, and Molar Mass of Compounds
 2. Percent Composition
 3. Empirical Formula versus Molecular Formula

H. Chemical Equations.
 1. Writing and Balancing Chemical Equation.
 2. Types of Chemical Equations
 3. Heat: Endothermic and Exothermic Reactions

I. Calculations from Chemical Equations
 1. Introduction to Stoichiometry: the Mole-Mass Ratio Method
 2. Limiting Reactant and Yield Calculations.

J. Chemical Bonds: The Formation of Compounds from Atoms
 1. The Ionic Bond: Transfer from Electrons from one Atom to another
 2. The Covalent Bond: Sharing of Electrons
 3. Electro-negativity
 4. Drawing Lewis Structures

K. The Gaseous State of Matter
 1. General Properties of Gases
 2. The Laws of Boyle, Charles, and Gay-Lussac
 3. Standard Temperature and Pressure
 4. Avogadro's Law

L. Water and the Properties of Liquids

1. The structure of the Water Molecule
   2. The Hydrogen Bond

M. Solutions.
 1. Types and General Properties of Solutions
 2. Factors related to Solubility
 3. Concentration Calculations

N. Chemical Equilibrium
 1. Rates of Reactions
 2. The Principle of Le Chatelier
 3. Effect of Catalysts, Temperature, and Pressure on Chemical Equilibrium

Lab Content:

A. Introduction to safety. safety agreement and safety quiz.
B. Instrumental measurements.
C. Physical properties and chemical properties of matter.
D. Families of elements.
E. Naming molecular and ionic compounds.
F. Empirical formulas of compounds.
G. Analysis of alum, a salt used as styptic.
H. Precipitating calcium phosphate
I. Molecular models, working with the molecular modeling box and understanding covalent bonding.
J. Analysis of salt water.
K. Generating hydrogen gas, an alternative fuel.
L. Analysis of vinegar.
M. Electrical conductivity of aqueous solutions.

<div align="center">V. APPROPRIATE READINGS</div>

Reading assignments may include but are not limited to the following:

    I. Sample Text Title:
   1. Recommended - Zumdahl, S. Z., DeCoste, D. J. *Introductory Chemistry: A Foundation,* ed. Seventh Charles Hartford, 2010,
   2. Recommended - Peters, Cracolice *Introductory Chemistry, An Active Learning Approach,* ed. 4th Thomson, Brooks/Cole, 2009,
   3. Recommended - Hein & Arena *Foundations of College Chemistry,* ed. 11th Wiley, 2004,

    II. Other Readings

___ Global or international materials or concepts are appropriately included in this course
___ Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

<div align="center">VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:</div>

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing			
	Check either 1 or 2 below		
X	***1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.***		
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.		
X	a) essay exam(s)	X	d) written homework
	b) term or other paper(s)		e) reading reports
X	c) laboratory report(s)		f) other (specify)

Required assignments may include but are not limited to the following:
Laboratory reports and essay questions on exams.

B. Problem Solving			
Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)	X	d) laboratory reports
X	b) quizzes		e) field work

X	c) homework problems			f) other (specify):

Required assignments may include but are not limited to the following:
Homework problems are assigned from the textbook.

C. Skill demonstrations, including:			
	a) class performance(s)		c) performance exams(s)
	b) field work		d) other (specify)

Required assignments may include but are not limited to the following:

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false		e) other (specify):
X	c) matching items		

COURSE GRADE DETERMINATION:

Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

Exams (5) 45% Final 15% Quizzes, homework 10% Participation 5% Laboratory 25%

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):

College-Level Criteria Met

	YES	NO
Textbook	X	
Reference materials	X	
Instructor-prepared materials	X	
Audio-visual materials	X	

Indicate Method of evaluation:

Used readability formulae (grade level 10 or higher)	
Text is used in a college-level course	X
Used grading provided by publisher	
Other: (please explain; relate to Skills Levels)	

	YES	NO
Computation Level (Eligible for MATH 101 level or higher where applicable)	X	

Content

	YES	NO
Breadth of ideas covered clearly meets college-level learning objectives of this course	X	

Presentation of content and/or exercises/projects:

	YES	NO
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	X	
Requires independent thought and study	X	
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	X	

List of Reading/Educational Materials

Recommended - Zumdahl, S. Z., DeCoste, D. J. *Introductory Chemistry: A Foundation,* ed. Seventh Charles Hartford, 2010,
Recommended - Peters, Cracolice *Introductory Chemistry, An Active Learning Approach,* ed. 4th Thomson, Brooks/Cole, 2009,
Recommended - Hein & Arena *Foundations of College Chemistry,* ed. 11th Wiley, 2004,

Comments:

	This course requires special or additional library materials (list attached).
X	This course requires special facilities: Chemistry Lab

Attached Files:

<table>
<tr>
<td colspan="2">BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least <u>three</u> major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.</td>
</tr>
<tr>
<td>(eligibility for English 126)
(as outcomes for English 262)

__X__ Using phonetic, structural, contextual, and dictionary
     skills to attack and understand words.
_____ Applying word analysis skills to reading in context.
__X__ Using adequate basic functional vocabulary skills.
__X__ Using textbook study skills and outlining skills.
_____ Using a full range of literal comprehension skills and
     basic analytical skills such as predicting, inferring,
     concluding, and evaluating.</td>
<td>1. Students are required to read a college-level textbook with reasonably sophisticated vocabulary.

2. Students are required to read lab manuals, comprehend a stepwise lab procedure and understand lab safety precautions.

3. Basic analytical skills are required for good comprehension of dense readings.</td>
</tr>
<tr>
<td>(eligibility for English 125)
(as outcomes for English 252)

__X__ Writing complete English sentences and avoiding
     errors most of the time.
__X__ Using the conventions of English writing: capitalization,
     punctuation, spelling, etc.
_____ Using verbs correctly in present, past, future, and
     present perfect tenses, and using the correct forms of
     common irregular verbs.
__X__ Expanding and developing basic sentence structure with
     appropriate modification.
_____ Combining sentences using coordination, subordination,
     and phrases.
_____ Expressing the writer's ideas in short personal papers
     utilizing the writing process in their development.</td>
<td>1. Students are required to write answers with complete English sentences.

2. To understand the difference between an element, a compound and a mixture students need to write well organized and coherent prose.

3. In lab reports students need to combine written observations into a conclusion, which necessitates the ability to think and write systematically and write well organized prose.</td>
</tr>
<tr>
<td colspan="2"><u>Check the appropriate spaces.</u>
_____ Eligibility for Math 101 is advisory for the target course.
__X__ Eligibility for English 126 is advisory for the target course.
__X__ Eligibility for English 125 is advisory for the target course.
<i>   If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.</i></td>
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CONTENT REVIEW

REQUISITES

No requisites