



CREDIT COURSE OUTLINE

I. COVER PAGE

(1) CHEM 10	(2) ELEMENTARY CHEMISTRY	(3) 4
Number	Title	Units

<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3">(4) Lecture / Lab Hours:</td> </tr> <tr> <td colspan="3">Total Course Hours</td> </tr> <tr> <td style="width: 20%;"></td> <td style="width: 20%;">Total Lec hours:</td> <td style="width: 20%; text-align: center;">3.00</td> </tr> <tr> <td></td> <td>Total Lab hours:</td> <td style="text-align: center;">3.00</td> </tr> <tr> <td></td> <td>Total Contact hours:</td> <td style="text-align: center;">108.00</td> </tr> <tr> <td colspan="3">Lec will generate <u>0</u> hour(s) outside work.</td> </tr> <tr> <td colspan="3">Lab will generate <u>0</u> hour(s) outside work.</td> </tr> <tr> <td colspan="3">(5) Grading Basis:</td> </tr> <tr> <td style="width: 20%;">Grading Scale Only</td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> </tr> <tr> <td>Pass/No Pass option</td> <td></td> <td style="text-align: center;">X</td> </tr> <tr> <td>Pass/No Pass only</td> <td></td> <td></td> </tr> <tr> <td colspan="3">(6) Advisories:</td> </tr> <tr> <td colspan="3">Eligibility for English 126</td> </tr> <tr> <td colspan="3">Eligibility for English 125</td> </tr> <tr> <td colspan="3">(7) Pre-requisites(requires C grade or better):</td> </tr> <tr> <td colspan="3">Corequisites:</td> </tr> </table>	(4) Lecture / Lab Hours:			Total Course Hours				Total Lec hours:	3.00		Total Lab hours:	3.00		Total Contact hours:	108.00	Lec will generate <u>0</u> hour(s) outside work.			Lab will generate <u>0</u> hour(s) outside work.			(5) Grading Basis:			Grading Scale Only			Pass/No Pass option		X	Pass/No Pass only			(6) Advisories:			Eligibility for English 126			Eligibility for English 125			(7) Pre-requisites(requires C grade or better):			Corequisites:			<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3">(8) Classification:</td> </tr> <tr> <td style="width: 20%;"></td> <td style="width: 20%;">Degree applicable:</td> <td style="width: 20%; text-align: center;">X</td> </tr> <tr> <td></td> <td>Non-degree applicable:</td> <td></td> </tr> <tr> <td></td> <td>Basic skills:</td> <td></td> </tr> <tr> <td colspan="3">(9) RC Fulfills AS/AA degree requirement: (area)</td> </tr> <tr> <td colspan="3">General education category:</td> </tr> <tr> <td colspan="3">Area A Natural Sciences</td> </tr> <tr> <td colspan="3">Major:</td> </tr> <tr> <td colspan="3">Certificate of:</td> </tr> <tr> <td colspan="3">Certificate in:</td> </tr> <tr> <td colspan="3">(10) CSU Baccalaureate:</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">X</td> </tr> <tr> <td colspan="3">(11) Repeatable: (A course may be repeated three times)</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">0</td> </tr> </table>	(8) Classification:				Degree applicable:	X		Non-degree applicable:			Basic skills:		(9) RC Fulfills AS/AA degree requirement: (area)			General education category:			Area A Natural Sciences			Major:			Certificate of:			Certificate in:			(10) CSU Baccalaureate:					X	(11) Repeatable: (A course may be repeated three times)					0
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(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. Gain a working knowledge of the periodic table and demonstrate this 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 ideal gas behavior is, and get acquainted with the ideal gas law developed by Boyle and Gay-Lussac
- VII. Interpret basic instructions in a laboratory manual and get familiar with specific safety procedures in a chemical lab

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 Model 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.

V. APPROPRIATE READINGS**Reading assignments may include but are not limited to the following:**

I. Sample Text Title:

1. Recommended - Corwin *Introductory Chemistry: Concepts and Connections, Laboratory Manual*, ed. 3rd Prentice Hall, 2001,
2. Recommended - Hein & Arena *Foundations of College Chemistry*, ed. 11th Wiley, 2004,
3. Recommended - Peters, Cracolice *Introductory Chemistry, An Active Learning Approach*, ed. 3rd Thomson, Brooks/Cole, 2006,

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.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

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. <i>Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.</i>		
	2. <i>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.</i>		
X	a) essay exam(s)	X	d) written homework
	b) term or other paper(s)		e) reading reports
	c) laboratory report(s)		f) other (specify)

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

Sample question homework:

1. Given the following names of salts and acids, write the correct formulas.
 - a. Sodium sulfate
 - b. Iron(II) chloride
 - c. Copper(II) nitrate
 - d. Ammonium phosphate

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:

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

Lab Report Example

Based on the observation in this experiment, which is shown hereunder, fill in the underlined areas in the equation.

Observation: A white precipitate was formed when solutions of barium chloride and sulfuric acid were mixed.

Write names of compounds: _____ (aq)+ _____ (aq) -- --? _____ (s)+ _____ ()

C. Skill demonstrations, including:			
<input type="checkbox"/>	a) class performance(s)	<input type="checkbox"/>	c) performance exams(s)
<input type="checkbox"/>	b) field work	<input type="checkbox"/>	d) other (specify)

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

D. Objective examinations including:			
<input checked="" type="checkbox"/>	a) multiple choice	<input checked="" type="checkbox"/>	d) completion
<input checked="" type="checkbox"/>	b) true/false	<input type="checkbox"/>	e) other (specify):
<input checked="" type="checkbox"/>	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.

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	<u> X </u>	<u> </u>
Reference materials	<u> X </u>	<u> </u>
Instructor-prepared materials	<u> X </u>	<u> </u>
Audio-visual materials	<u> X </u>	<u> </u>

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

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u> X </u>	<u> </u>
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	<u> X </u>	<u> </u>
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	<u> X </u>	<u> </u>
Requires independent thought and study	<u> X </u>	<u> </u>
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	<u> X </u>	<u> </u>

List of Reading/Educational Materials
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Comments:

 This course requires special or additional library materials (list attached).

X This course requires special facilities:
Chemistry Lab

Attached Files:

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.	
<p>(eligibility for English 126) (as outcomes for English 262)</p> <p><u> X </u> Using phonetic, structural, contextual, and dictionary skills to attack and understand words.</p> <p><u> </u> Applying word analysis skills to reading in context.</p> <p><u> </u> Using adequate basic functional vocabulary skills.</p> <p><u> </u> Using textbook study skills and outlining skills.</p> <p><u> </u> Using a full range of literal comprehension skills and basic analytical skills such as predicting, inferring, concluding, and evaluating.</p>	<ol style="list-style-type: none">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.
<p>(eligibility for English 125) (as outcomes for English 252)</p> <p><u> X </u> Writing complete English sentences and avoiding errors most of the time.</p> <p><u> </u> Using the conventions of English writing: capitalization, punctuation, spelling, etc.</p> <p><u> </u> Using verbs correctly in present, past, future, and present perfect tenses, and using the correct forms of common irregular verbs.</p> <p><u> </u> Expanding and developing basic sentence structure with appropriate modification.</p> <p><u> </u> Combining sentences using coordination, subordination, and phrases.</p> <p><u> </u> Expressing the writer's ideas in short personal papers utilizing the writing process in their development.</p>	<ol style="list-style-type: none">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.
<p><u>Check the appropriate spaces.</u></p> <p><u> </u> Eligibility for Math 101 is advisory for the target course.</p> <p><u> X </u> Eligibility for English 126 is advisory for the target course.</p> <p><u> X </u> Eligibility for English 125 is advisory for the target course.</p> <p><i><u>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.</u></i></p>	

CONTENT REVIEW

REQUISITES
No requisites