CHEM A030N: CHEMISTRY SKILLS FOR PREPARATION FOR GENERAL CHEMISTRY NONCREDIT

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	493062 - Secondary Education (Grades 9-12) and G.E.D.
Units	0 Total Units
Hours	18 Total Hours (Lecture Hours 18)
Total Outside of Class Hours	0
Course Credit Status	Noncredit (N)
Material Fee	No
Basic Skills	Basic Skills (B)
Repeatable	Yes; Repeat Limit 99
Grading Policy	P/NP/SP Non-Credit (D)

Course Description

This is a course designed to provide additional practice of the concepts learned in CHEM A130 - Preparation for General Chemistry. Students will develop skills necessary to successfully demonstrate competency in CHEM A130. This course is part if the Chemistry Skills Certificate of Competency. Noncredit. NOT DEGREE APPLICABLE. COREQUISITE: CHEM A130. Not Transferable.

Course Level Student Learning Outcome(s)

1. Use unit equations and simple algebraic methods to solve computational problems in the areas of unit conversion, specific heat, stoichiometry, gas laws, and solution concentrations.
2. Write and balance total ionic and net ionic equations for chemical reactions, including predicting the products of ionic reactions and writing the correct ionic formulas.
3. Apply the principles of electron configurations, Lewis structural theory, and VSEPR theory to predict the structure and three-dimensional shape of simple inorganic and organic species from the chemical formula.
4. Use nomenclature rules to provide a systematic name for a chemical formula or a chemical formula from a systematic name.

Course Objectives

- 1. Apply basic algebraic manipulations to solve chemistry problems using the unit equation approach.
- 2. Know the names and chemical symbols of common elements and common ions, including polyatomic ions. Name chemical formulas or determine chemical formulas from names to include ionic compounds, molecular compounds, and acids using systematic nomenclature rules.
- 3. Demonstrate a basic understanding of modern atomic theory, including any understanding of the structure of the atom; the relationship between electromagnetic radiation and energy; the Bohr model and the wave mechanical model of the atom; electron configurations for the first eighteen elements, and the relationship of atomic properties and the periodic table.
- 4. Describe the different types of chemical bonds including an ability to discuss the nature of bonding in terms of electronegativity, bond polarity, Lewis structures, VSEPR theory, and molecular structures.
- 5. Understand chemical composition to include the mole concept, the calculations of molar mass, percent composition of compounds, and the calculation of empirical formulas and actual formulas from data or percent composition.
- 6. Format and balance simple chemical equations and use these balanced equations in simple quantitative calculations.
- 7. Recognize the evidence for a chemical reaction and classify chemical reactions by type, to include precipitation, acid-base and redox reactions that occur in aqueous solutions. Understand reaction patterns such as double displacement, single displacement, decomposition, combination and combustion.
- 8. Be familiar with kinetic molecular theory for gases, the ideal gas laws, and gas stoichiometry.
- 9. Understand solubility and use solubility rules in predicting reactions, and be familiar with common methods for expressing the concentration or content of solutions.
- 10. Use the basic units of the SI System for length, mass, volume, and derived units such as density and molarity.
- 11. Apply the significant figure rules regarding the limitations of measurements in calculations when rounding and refining calculated values.

Lecture Content

Developing a Master Schedule Significant Figures Precision Accuracy Linear Scales Unit Equation Approach to Problem Solving Element Ion Nomenclature Nomenclature: Naming Chemical Compounds, Writing Formulas from Names Reviewing a Graded Exam Writing, Balancing Classifying Chemical Equations Stoichiometry: The Basics, Limiting Excess Reactants, Percent Yield Electron Configuration Orbital Diagrams Lewi s Structures VSEPR/Molecular Geometry Significant Figure Review Heating Curve Solutions Nomenclature Review Gas Laws Final Exam Preparation

Method(s) of Instruction

- Enhanced NC Lect (NC1)
- Online Enhanced NC Lect (NC5)
- Live Online Enhanced NC Lect (NC9)

Instructional Techniques

A. Lecture, demonstration and discussion B. Cooperative learning strategies using group work C. Guided practice and study using worksheets

Reading Assignments

Each topic discussed will include a written description which can be referred to while completing worksheets.

Writing Assignments

Worksheet completion will include the need to write explanations of work

Out-of-class Assignments

Completion of worksheets introduced in class

Demonstration of Critical Thinking

Graded worksheets will demonstration abilities to explain concepts and describe principles in writing as well as the development of problem solving skills.

Required Writing, Problem Solving, Skills Demonstration

Weekly quizzes will include some questions requiring the writing of sentence explanations and/or descriptions. Students will be expected to analyze questions and generate answers to them. Some answers will be in the language of mathematics and others will be in English. Some questions will require the use of principles to synthesize an answer which was not taught.

Eligible Disciplines

Chemistry: Masters degree in chemistry OR bachelors degree in chemistry or biochemistry AND masters degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Masters degree required.

Other Resources

1. All printed material will be provided as a workbook produced by the Chemistry Department.