CHEM A010N: CHEMISTRY SKILLS FOR INTRODUCTORY CHEMISTRY NONCREDIT

Item	Value
Curriculum Committee Approval Date	03/23/2023
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
Open Entry/Open Exit	Yes
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 A110 - Introductory Chemistry. Students will develop skills necessary to successfully demonstrate competency in CHEM A110. This course is expected to increase retention and student success and is a part of the Chemistry Skills Certificate of Competency. Noncredit. NOT DEGREE APPLICABLE. COREQUISITE: CHEM A110. Not Transferable.

Course Level Student Learning Outcome(s)

1. Solve calculational problems in the areas of unit conversion, stoichiometry, gas laws, pH determination, and solution concentrations using unit equations and simple algebraic methods
2. 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.
3. Using inorganic and organic nomenclature rules to provide a systematic name for a chemical structure or a chemical structure from a systematic name.
4. Demonstrate a basic knowledge of basic organic chemistry reactions of alkanes, alkenes, alkynes, cycloalkanes, alcohols, ethers, amines, amides, carboxylic acids, aldehydes, and ketones by drawing the Lewis chemical structures of the predicted products of organic reactions when given the structures of reactants and reaction conditions.
5. Employ safe and proper laboratory techniques to make accurate, reproducible measurements of masses and volumes, and accurate, reproducible experimental observations.

Course Objectives

- 1. Define and use common chemical terms.
- 2. Solve problems using chemical relationships and the unit-equation approach.
- 3. Demonstrate safe and proper techniques for common laboratory procedures.
- 4. Represent chemical species correctly in the writing of chemical equations and inorganic reactions.
- 5. Discuss the relationship between the structure of a functional group and the physical and chemical properties of the different classes of organic compounds.
- 6. Demonstrate knowledge of basic organic nomenclature of alkanes, alkenes, alkynes, cycloalkanes, alcohols, ethers, amines, amides, carboxylic acids, aldehydes, and ketones.
- 7. Demonstrate knowledge of basic organic reactions.
- 8. Predict the shapes of organic and inorganic compounds using VSEPR theory.
- 9. Demonstrate knowledge of major metabolic pathways.

Lecture Content

1. Developing a Master Schedule 2. Math in Chemistry: Significant Figures, Scientific Notation, Rounding3. Units of Measurement, Metric System4. Linear Scales 5. Unit Equation Approach to Problem Solving6. Energy, Phase Changes Heating Curves7. Elements, the Periodic Table, the Atom 8. Ions and Ionic Compounds9. Molecules and Molecular Compounds10.Nomenclature: Naming Chemical Compounds, Writing Formulas from Names11. Lewis Structures, VSEPR/Molecular Shapes, Polarity Intermolecular Forces12. The Mole and Molar Mass Calculations 13. Writing, Balancing Classifying Chemical Equations 14. Stoichiometry: Mole Relationships Mass Calculations15. Solutions16. Gas Laws17. Acids Bases18. Organic Chemistry: Hydrocarbons and Functional Groups19. Carbohydrates20. Lipids21. Proteins22. Nucleic Acids23. 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: Master's degree in chemistry OR bachelor's degree in chemistry or biochemistry AND master's degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Master's degree required.

Other Resources

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