CHEM A085N: CHEMISTRY STUDY SKILLS FOR GENERAL CHEMISTRY B

Item	Value
Curriculum Committee Approval Date	03/23/2022
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 A185 - General Chemistry B. Students will develop skills necessary to successfully demonstrate competency in CHEM A185. This course is expected to increase retention and student success in CHEM A185 and is a part of the Chemistry Skills Certificate of Competency. Noncredit. NOT DEGREE APPLICABLE. COREQUISITE: CHEM A185. Not Transferable.

Course Level Student Learning Outcome(s)

1. Use the atomic theory and kinetic molecular theory to explain the properties of solids, liquids, gases, and solutions.
2. Use equilibrium expressions and the principle of Le Chatelier to calculate the concentrations of species in chemical systems at equilibrium and to predict the changes that occur in response to perturbations to chemical systems at equilibrium.
3. Use unit equations and algebraic methods to solve computational problems in the areas of unit conversion, chemical equilibria, thermodynamics, electrochemistry, and kinetics.
4. Apply thermodynamic properties such as enthalpy, entropy, and free-energy to describe the behavior, energy changes, and spontaneity of chemical reactions.

Course Objectives

- 1. Demonstrate an understanding of intermolecular forces and the impact they have on the physical properties of chemicals.
- 2. Understand the processes involved in the formation of solutions and be able to quantify the colligative properties of solutions.
- 3. Be familiar with the factors that impact the rate of a chemical reaction and be able to perform kinetic calculations involved with some basic chemical equations.
- 4. Develop an understanding of equilibrium and equilibrium expressions.
- 5. Use knowledge of chemical equilibrium to calculate the concentrations of species in chemical systems at equilibrium, with special emphasis on acids and bases, precipitates, and complex ions.
- 6. Demonstrate an understanding of thermodynamic properties such as enthalpy, entropy, and free-energy that can be used to describe the behavior, energy changes, and spontaneity of chemical reactions.
- 7. Develop an understanding of electrochemistry and use this knowledge to calculate cell potential, change in free energy, and equilibrium constants.

Lecture Content

1-Review of Lewis Structures and Thermodynamics 2-Types of Intermolecular Forces, Relative Strengths, and Impact on Physical Properties3-Intermolecular Forces and Physical Properties, Structure and Bonding in Solids 4-Quantitative Descriptions of Solutions, Solution Formation and Intermolecular Forces5-Solubility of Gases and Colligative Properties6-Stoichiometry and Reaction Rates, Determining Rate Laws, Integrated Rate Laws7-Arrhenius Equation, Collision Theory, Transition State Theory8-Reaction Mechanisms, Reaction Profiles, and Catalysis 9-Introduction to Equilibrium, Activity, Le Chateliers Principle 10-Calculating Equilibrium Constants and Concentrations 11-Acid and Base Equilibrium, pH Calculations, Acid/Base Properties and Structure12-Common Ion Effect and Buffers13-Titration Calculations in Detail14-Solubility Equilibria and Complex Ion Equilibria15-Entropy and Gibbs Free Energy16-Electrochemistry

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

Lecture Notes from Chemistry 185 and the textbook readings associated with Chemistry 185.

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

Each week, worksheets will be given that contain a variety of problems. Critical thinking will be evaluated through complex mathematical problems as well as problems that involve written answers.

Required Writing, Problem Solving, Skills Demonstration

Weekly quizzes will include 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. The students will be expected to reference their lecture notes from Chemistry 185 and the textbook associated with that class.