CHM 1025C
Introductory Chemistry (5) (A.A.)

Catalog Description: Three hours lecture, three hours lab per week. Prerequisite: MAT 1033 with a grade of “C” or better. This course meets the Area V requirements for the A.A./A.A.S./A.S. general education requirements. This course is designed primarily to prepare students for entrance into the general chemistry course, CHM 2045C.

Performance Standards:

At the successful completion of this course, the student should be able to:

1. Understand the scientific method and its importance to scientific discovery.
2. Distinguish between physical and chemical changes, physical and chemical properties, and intensive and extensive properties.
3. Use the dimensional analysis method to solve problems such as conversions within the metric system, between the metric and the English system and between mass and volume given density.
4. Use exponential numbers, scientific notation, significant figures and units in calculations.
5. Classify matter as heterogeneous or homogeneous, pure substance or mixture, element or compound.
6. Explain the properties and predict behavior of solids, liquids and gases using the Kinetic Molecular Theory.
7. Relate names and formulas for common elements, monatomic ions (using Stock system for metal ions), common polyatomic ions, ionic compounds and binary molecular compounds.
8. Summarize the development of atomic theory, including evolution of Dalton’s Theory into the modern atomic theory.
9. Explain the atom’s nuclear make-up, isotopes, atomic number and mass number. Calculate atomic mass from isotopic masses and abundance data.
10. Understand the mole concept, relating number of particles to mass and moles.
11. Use the periodic table to rationalize periodic and group trends including electron configuration, ionization energy, atomic size and electronegativity.
12. Distinguish between ionic and covalent bonding, describing chemical bonding by using Lewis structures.
13. Use VSEPR theory to predict linear, planar triangular and tetrahedral electron pair geometry and molecular geometry for simple compounds with one or two central atoms.
14. Classify reactions as combination, decomposition, single replacement and double replacement. Write balanced equations from descriptions of these reactions.
15. Write balanced equations showing the complete combustion of simple hydrocarbons and hydrocarbon derivatives.
16. Use the activity series to complete balanced equations for single replacement reactions given the reactants.

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17. Use solubility information to complete balanced equations for double replacement reactions featuring precipitation, neutralization and formation of unstable products.

18. Rationalize the behavior of an ideal gas, using the gas laws and the kinetic molecular theory.

19. Use the combined gas law formula and the ideal gas law formula to calculate one of the following for an ideal gas sample given the others: volume, temperature, pressure, density, number of moles and molar mass.

20. Perform calculations relating experimental data to empirical and molecular formulas.

21. Perform calculations based on the coefficients of a balanced equation (stoichiometry) including the determination of percent yield and limiting reactants.

22. Perform calculations involving percent by mass and molarity of aqueous solutions.

23. Compare and contrast acids, bases, salts, electrolytes, neutralization, and pH. Perform calculations relating concentrations of strong acids and bases to whole-number pH and pOH.

24. Differentiate between oxidation and reduction processes, writing simple balanced half-reactions and adding them to get net-ionic equations for full redox reactions.

25. Perform laboratory experiments designed to illustrate and supplement lecture content.