

COLLEGEWIDE COURSE OUTLINE OF RECORD

CHEM 105, GENERAL CHEMISTRY I

COURSE TITLE: General Chemistry I

COURSE NUMBER: CHEM 105

PREREQUISITES: MATH 136 College Algebra and demonstrated competency through appropriate assessment or earning a grade of "C" or better in ENGL 093 Introduction to College Writing and ENGL 083 Reading Strategies for College or ENGL 095 Integrated Reading and Writing

SCHOOL: Liberal Arts and Sciences

PROGRAM: Liberal Arts

CREDIT HOURS: 5

CONTACT HOURS: Lecture: 3 Lab: 4

DATE OF LAST REVISION: Fall, 2012

EFFECTIVE DATE OF THIS REVISION: Fall, 2014

CATALOG DESCRIPTION: The first in a series of two courses designed to cover general chemistry including measurement, atoms, molecules and ions, stoichiometry, chemical reactions, solids, liquids, and gases thermochemistry, atomic structure, and molecular bonding. One year of high school chemistry or one semester of college introductory chemistry is recommended. Includes lab.

MAJOR COURSE LEARNING OBJECTIVES: Upon successful completion of this course the student will be expected to:

1. Explain and use the measurement techniques including correct unit conversions, dimensional analysis, and significant figures.
2. List the parts of an atom, classify matter, name those substances and discuss their place on the periodic table.
3. Apply the concepts of stoichiometry including molar mass, percent composition, balancing equations and limiting reagents.
4. Categorize chemical reactions and predict the products of common chemical reactions
5. Describe the kinetic molecular theory of gases and apply the knowledge using accepted gas laws.
6. Explain the basics of thermochemistry including enthalpy, calorimetry, Hess's law, and standard enthalpies of formation.
7. Interpret the quantum mechanical model of the atom including quantum numbers, orbital shapes, orbital energies, electron spin and the Pauli Principle as well as the periodicity, which rises from this model.
8. Illustrate the basic concepts of ionic bonding and polar covalent bonding and their relationship to electron configuration, as related to the concepts of electronegativity, bond polarity and dipole moment.
9. Compare the VSEPR model, the hybridization model and the molecular orbital model for covalent bonding.

10. Identify intermolecular forces in the liquid state and relate how they effect solution formation, vapor pressure, boiling point and other colligative properties.
11. Relate the general structure of solids especially molecular solids and ionic solids.

COURSE CONTENT: Topical areas of study include –

Scientific method	Measurements and Units	Significant figures
Density	Elements	Compounds
Mixtures	Nomenclature	Chemical reactions
Chemical equations	Precipitation reactions	Redox reactions
The mole	Molar mass	Stoichiometry
Limiting reagents	Properties of gases	Gas laws
Molecular motion	Energy, heat, enthalpy	Enthalpy of chemical reactions
Atomic structure	Orbital theory	Electron configurations
Periodicity	Ionic bonding	Covalent bonding
Lewis structures	Molecular structure	VSEPR model
Polarity	Bond strength and lengths	Valence bond theory
Molecular orbital theory	Intermolecular forces	Liquid structure
Solid structure	Phase changes	Solutions
Solubility	Colligative properties	

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The Ivy Tech Library is available to students' on- and off-campus, offering full text journals and books and other resources essential for course assignments. Go to <http://www.ivytech.edu/library/> and choose the link for your campus.

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