

Jacksonville State University
College of Arts and Sciences
Updated June 27, 2006

CY 105 GENERAL CHEMISTRY I

COURSE DESCRIPTION

Lecture/3 hours. *Concurrent enrollment in CY 107 is required.* Part I of a two-semester sequence. General chemistry for science majors, including basic principles and laws of chemistry. Topics include measurements, dimensional analysis, reaction and stoichiometry, periodicity, atomic structure, bonding and molecular structure, and an introduction to organic chemistry.

TEXT

Chemistry, The Central Science, 9th ed., by Brown, LeMay & Bursten

COURSE OBJECTIVES

- To introduce measurements and calculations using the metric system.
- To introduce chemical nomenclature.
- To illustrate solving problems using the mole concept and stoichiometry.
- To introduce chemical reactivities and use this information to balance chemical equations.
- To introduce the release and uptake of heat in chemical reactions.
- To introduce the nature of electromagnetic radiation and interactions of electromagnetic radiation with atoms.
- To demonstrate the periodicity of the periodic table.
- To introduce the electronic structure of atoms.
- To introduce chemical bond formation and how this relates to molecular geometry.

COURSE OUTLINE

- Chapter 1: matter, units of measurement, uncertainty in measurements, dimensional analysis
- Chapter 2: atomic theory of matter, atomic structure, atomic weights, periodic table, molecular and ionic compounds, chemical nomenclature
- Chapter 3: chemical equations, reactivity, formula weights, the mole concept, empirical formulas, limiting reactants
- Chapter 4: aqueous solutions, precipitation reactions, acid-base reactions, redox reactions, solution stoichiometry
- Chapter 5: first and second laws of thermodynamics, enthalpies of reaction, calorimetry, Hess's law, enthalpies of formation

Chapter 6: wave nature of light, photons, line spectra, wave behavior of matter, quantum mechanics, atomic orbitals, electron configurations

Chapter 7: development of the periodic table, effective nuclear charge, sizes of atoms and ions, ionization energy, electron affinities, metals, nonmetals and metalloids

Chapter 8: ionic bonds, covalent bonds, bond polarity, electronegativity, Lewis structures, resonance, octet rule

Chapter 9: molecular shapes, VSEPR model, molecular polarity, hybrid orbitals, multiple bonds, molecular orbitals

Chapter 25: characteristics of organic molecules, hydrocarbons, alkanes, unsaturated hydrocarbons, functional groups, chirality

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CY 107 GENERAL CHEMISTRY LAB I

COURSE DESCRIPTION

Concurrent enrollment in CY 105 is required. Basic principles of matter will be explored. Topics of experimentation include obtaining accurate measurements, identifying unknown substances from their physical and chemical properties, purifying matter, exploring gas laws, and performing an acid-base titration.

TEXT

General Chemistry Lab Manual CY-107, by Gryko and Knight

COURSE OBJECTIVES

To illustrate fundamental chemical principles through laboratory experiments.
To involve the student in planning a laboratory experiment.
To introduce basic laboratory techniques.
To learn how to make accurate measurements using a variety of laboratory equipment.
To illustrate the treatment and interpretation of laboratory data.
To learn and practice the principles of laboratory safety.

COURSE OUTLINE

	<u>Exp. #</u>	<u>Exp. Title</u>	<u>Pre-lab probs.</u>	<u>Post-lab probs.</u>
0			1,3 AND	
1	Density		1,3,4	none
2	Lab Skills			
3	Hydrate		1,3,5	1
4	Solutions		2,3,6	2,4,6
5	Reactions			1,2,4
6	Analysis		2,4	2,5
7	Acid-Base		1,4	2,3
8	Quantitative Analysis		2 (page 76)	2 (page 84)
9	Light Spectroscopy		2,3	
10	Concentrations		1,3	1,4,5

Lab Final