

## COURSE DESCRIPTION

Dept., Number	Chem 105	Course Title	General Chemistry I
Semester hours	3	Course Coordinator	Walter E. Cleland, Jr., Associate Professor

### Current Catalog Description

Atomic and molecular structure, stoichiometry, solutions, physical properties of gases, liquids and solids, chemical bonding, kinetics, thermodynamics and equilibrium, acid-base chemistry and the descriptive chemistry of the elements.

### Textbook

John W. Hill, Ralph H. Petrucci, Terry W. McCreary, and Scott S. Perry. *General Chemistry*, 4<sup>th</sup> edition, Pearson / Prentice Hall Publishing Company, New Jersey 2005 (ISBN# 0-536-94551-9).

### References

--

### Course Outcomes

Upon successful completion of this course, the students:

1. master basic chemical terminology, nomenclature, and calculations; appreciate various types of measurements and their limitations
2. understand stoichiometric principles of chemical reactions, especially with application to reactions in solution and the gas phase
3. understand the behavior and characteristics of solid, liquid, and gas phases of matter
4. understand basic concepts of thermochemistry
5. understand modern atomic theory and the periodic properties and reactivities of elements and ions
6. understand concepts of chemical bonding and molecular structure
7. have enhanced quantitative problem solving ability, with applications to general chemistry and other area.

## Relationship between Course Outcomes and Program Outcomes

The ABET/CAC criteria for computer science require 30 credit hours of science and mathematics appropriate for the discipline. The BSCS program meets this criterion by requiring 14 hours of natural science courses intended for majors in those fields, including a two-course sequence with associated laboratories in one field, and 18 hours of mathematics beyond the precalculus level. Chemistry 105 and 106 and their associated laboratories, Chemistry 115 and 116, form one option for satisfying the laboratory science requirement. The course outcomes are related to the expectations for the role of natural science in the BSCS curriculum.

## Prerequisites by Topic

Minimum ACT mathematics score of 22 (SAT 510) or B minimum in College Algebra (Math 121) or Basic Mathematics for Science and Engineering (Math 125).

## Major Topics Covered in the Course

1. The tools of chemistry (2 hours)
2. Atoms, molecules and ions (4 hours)
3. Chemical reaction (4 hours)
4. Stoichiometry: quantitative information from chemical equations (4 hours)
5. Thermochemistry: energy and chemistry (3 hours)
6. Atomic structure and nuclear chemistry (3 hours)
7. Atomic electron configurations and chemical periodicity (4 hours)
8. Basic concepts of bonding and molecular structure (3 hours)
9. Further concepts of chemical bonding: Orbital hybridization, molecular orbitals, and metallic bonding (4 hours)
10. Gases and their behavior (3 hours)
11. Intermolecular forces, liquids, and solids (4 hours)
12. Tests and Final Examination (5 hours)

## Assessment Plan for the Course

The instructor assesses the student performance related to the course outcomes by using examinations, quizzes, and homework assignments.

How Data in the Course are Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

The conduct of this course is not governed by the ABET program faculty. No data are collected that are used to assess program outcomes directly.

## Estimate Curriculum Category Content (Semester hours)

Science 3 hours