I. CHM 111, College Chemistry I, 4 Semester Hours

II. Course Description

This is the first course in a two-semester sequence designed for the science or engineering major who is expected to have a strong background in mathematics. Topics in this course include measurement, nomenclature, stoichiometry, atomic structure, equations and reactions, basic concepts of thermochemistry, chemical and physical properties, bonding, molecular structure, gas laws, kinetic-molecular theory, liquids and solids, solutions, and colloids. Lab is required.

III. Prerequisite: MTH 112 (Precalculus Algebra) or equivalent math placement score; alternatively, individual colleges may elect to require MTH 112 as a co-requisite rather than a prerequisite.

IV. Co-requisite: Individual colleges may elect to require CHM 121 (Chemistry Recitation I) as a co-requisite.

V. Textbook

Due to the varied selection of quality college level textbooks, each college will select the textbook needed to meet the requirements of this course.

VI. Course Competencies

At the end of the course the student will be able to:

A. Solve measurement problems using dimensional analysis.
B. Write chemical formulas and name compounds.
C. Balance chemical equations and discuss types of reactions.
D. Solve stoichiometry problems.
E. Discuss thermochemistry concepts.
F. Solve thermochemistry problems.
G. Discuss atomic structure.
H. Discuss bonding concepts.
I. Discuss molecular orbital concepts.
J. Discuss the gas laws.
K. Solve gas law problems.
L. Discuss the kinetic-molecular theory.
M. Discuss the states of matter.
N. Discuss solutions and colloids.
O. Solve solution problems.

VII. Course Outline of Topics

Lecture Topics:

Fundamental Concepts
Dimensional Analysis
Chemical and Physical Properties
Atoms, Molecules, and Ions
Nomenclature
Mole Concept
Stoichiometry
Chemical Reactions
Limiting reagents
Theoretical, Actual, and percentage yield
Solution Stoichiometry
Introduction to thermochemistry
Specific Heat
Calorimetry
Structure of the atom
Electron configuration
Periodic table
Quantum mechanics
Trends of the periodic table
Bonding
Electronegativity
Ionization energy
Electron affinity
Lewis structure
Formal Charge
VSEPR
Molecular structure
Molecular orbitals
Polarity
The gaseous state
Kinetic-molecular theory
Solids and liquids
Crystals
Solutions
Concentrations
Colligative properties
Colloids

Suggested Laboratory Topics

Check in, Safety, Rules and regulations
Densities
Melting points
Solubility
Identification of an unknown compound
Chemical and physical changes
Synthesis of a compound
Thermal Decomposition
Percentage yield
Calorimetry
Activity of metals
Titration
Gas laws
Spectrophotometry
Colligative properties
Lab final, check out
VIII. Evaluation and Assessment

Grades will be composed of tests, lab work, a comprehensive final exam, and may include other assignments.
75-80 percent lecture, 20-25 percent laboratory
A minimum of 3 tests and a comprehensive final exam will be given.
A minimum of one test and a final exam will be given in laboratory.
Grades will be given based upon A = 90 – 100%, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, and F = below 60%.

IX. Attendance

Students are expected to attend all classes for which they are registered. Students who are unable to attend class regularly, regardless of the reason or circumstance, should withdraw from that class before poor attendance interferes with the student’s ability to achieve the objectives required in the course. Withdrawal from class can affect eligibility for federal financial aid.

X. Statement on Discrimination/Harassment

The College and the Alabama State Board of Education are committed to providing both employment and educational environments free of harassment or discrimination related to an individual’s race, color, gender, religion, national origin, age, or disability. Such harassment is a violation of State Board of Education policy. Any practice or behavior that constitutes harassment or discrimination will not be tolerated.

XI. Americans with Disabilities Act

The Rehabilitation Act of 1973 (Section 504) and the Americans with Disabilities Act of 1990 state that qualified students with disabilities who meet the essential functions and academic requirements are entitled to reasonable accommodations. It is the student’s responsibility to provide appropriate disability documentation to the College.