

CUMBERLAND COUNTY COLLEGE

Course: CH 101 General Chemistry I

Credits: 4

Prerequisite: completion of all remedial coursework in Math, English and Reading

Description: Offers fundamental principles of chemistry. Including the mole concept and stoichiometry, nomenclature, atomic and molecular structure, periodicity, chemical bonding, states of matter, kinetic theory and solution theory. The laboratory offers experiments in qualitative and quantitative analysis and synthesis.

Learning Outcomes:

At the completion of this course, students will be able to:

- Use the theories of chemistry, relevant to the topical outline below, in both a qualitative and quantitative manner.
- Plan and execute laboratory experiments in a safe, efficient and productive manner.
- Interpret laboratory data and observations.
- Prepare laboratory reports illustrative of the topical outline below.

Topical Outline:

Classroom

- Measurement
- Significant figures
- Numbers in scientific notation
- Accuracy vs. precision
- Elements, compounds and mixtures
- Problem solving techniques
- Atoms and molecules
- Nomenclature and formula writing
- Avagadro's hypothesis
- The mole concept
- Stoichiometry
- The periodic table
- Solutions
- Units of concentration
- Solution stoichiometry
- Electrolytic solutions
- The ideal gas
- Real gases
- The gas laws
- Kinetic molecular theory
- Electrons in atoms
- Line spectra of atoms
- Atomic orbital's

- Electron configurations
- Quantum numbers
- Atomic ionization potentials
- Atomic volume
- Electron affinity
- Electronegativity
- Electrons in molecules
- Ionic bonding
- The ionic lattice
- Covalent bonding
- Lewis structures
- Single, double and triple bonds
- The octet rule
- Deviations from the octet rule
- Molecular geometry
- Molecular dipole moments
- Inter vs. intra molecular force

Laboratory

- Qualitative analysis of ions in aqueous solution
- The formula of a hydrate
- The formula of a compound
- The synthesis of aspirin
- Identification of an unknown sulfate salt thru it's percent sulfate
- Standardization of a NaOH solution
- Identification of an unknown acid from it's molar mass
- Introduction to the theory and practice of IR spectroscopy
- Analysis of a Zn/Al alloy
- Avogadro's number from a monolayer
- Introduction to the theory and practice of NMR spectroscopy

Text:

Zumdahl, S. S., & Zumdahl, S. A. (2013). *Chemistry*. 9th ed., Brooks Cole Publishing
 Zumdahl, S. S., & Zumdahl, S. A. (2013). *Chemistry: Student Solutions Manual*. 9th ed.,
 Brooks Cole Publishing
 CCC Custom Chemistry 101 lab manual available at college bookstore.

Student Assessment:

By means of written exams, lab reports and class/lab participation.

Academic Integrity:

Plagiarism is cheating. Plagiarism is presenting in written work, in public speaking, and in oral reports the ideas or exact words of someone else without proper documentation.

Whether the act of plagiarism is deliberate or accidental [ignorance of the proper rules for handling material is no excuse], plagiarism is, indeed, a "criminal" offense. As such, a

plagiarized paper or report automatically receives a grade of **ZERO** and the student may receive a grade of **F** for the semester at the discretion of the instructor.

Tutoring & Project Assist:

If you are having difficulty with work in this class tutoring is available through the Center for Academic & Student Success. If you think that you might have a learning disability, contact Project Assist at 856.691.8600 x 1282 for information on assistance that can be provided to eligible students.

Before Withdrawing From This Course:

If a student experiences adverse circumstances while enrolled in this course and considers withdrawing, s/he should see an advisor (division or advisement center) BEFORE withdrawing from the class. A withdrawal may cause harmful repercussions to completion rate standards and overall GPA which can limit or eliminate future financial aid in addition to causing academic suspension.