CHEM 103: COLLEGE CHEMISTRY I

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Spring 2022
Credits:	5
Total Contact Hours:	144
Lecture Hours :	72
Lab Hours:	72
Hours Arranged:	0
Outside of Class Hours:	144
Prerequisite:	Elementary algebra or higher or direct placement based on multiple measures.
District General Education:	B2. Natural Sciences - Physical Sciences, B3. Natural Sciences - Laboratory
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

The first semester of a year program includes chemistry of inorganic compounds; covers topics of nomenclature, stoichiometry, bonding, chemical equations, gas laws, solutions, acids and bases, nuclear processes and chemical equilibrium. Required for students transferring to four-year college nursing programs and students majoring in physical therapy, occupational therapy, and home economics. 72 lecture hours, 72 lab hours.

Course Objectives

- use the metric system of measurement and have a reasonable facility to interconvert units
- solve a chemical problem involving acids or bases
- describe the different types and effects of radioactivity
- describe the properties of some of the common elements
- perform a titration to an acceptable accuracy
- use chemical laboratory equipment with an adequate facility
- observe and record chemical changes occurring in laboratory experiments
- read measurements correctly and estimate when reading in between divisions
- calculate results of experimental work using correct number of significant figures
- solve simple weight-weight and weight-volume problems in chemistry
- solve gas law (P, V, T) problems
- balance chemical equations
- describe the nature of bonding in ionic as well as covalent compounds
- describe the chemical relationship between the elements of a given chemical family
- write the name or symbol of about one-third of the known elements
- describe the electron structure of any of the common elements
- solve chemical solution problems using molarity or normality

Major Course Content

1. Introduction To Scientific Measurement: Metric System, Scientific Notation, Significant Figures, Dimensional Analysis, Density, Temperature
2. Matter: Elemental Properties, Periodic Table, Atomic Structure, Isotopes, Electronic Energies
3. Compounds: Ionic and Covalent Bonding, Chemical Nomenclature, Lewis Dot Structures, Molecular Structure
4. Chemical Reactions: Chemical Changes, Balancing Chemical Equations, Types of Reactions, Redox Reactions
5. The Mole and Stoiciometry: Mole Concept, Molar Mass, Stiochiometric Calculations, Limiting Reagent and Percent Yield
6. Energy: Specific Heat, Calorimetry, Energy in Changes of State
7. Gases: Kinetic Molecular Theory, Ideal Gases, Empirical Gas Laws, Partial Pressures
8. Solutions: Electrolytes, Solubility, Concentration
9. Chemical Equilibrium: Reaction Rates, Law of Mass Action, LeChatelier's Principle
10. Acid-Base Chemistry: Acid-base Definitions, Acid-base Strength, Autoionization of Water, pH Titrations, Buffers
11. Nuclear Processes: Radioactivity, Nuclear Reactions, Half-Life, Fission, Fusion, Uses of Radiation

Lab Content

1. Density Determination
2. Atomic Structure and Flame Tests
3. Electron Configurations and Periodic Properties
4. Compounds and Formulas
5. Chemical Nomenclature
6. Chemical Equations and Reactions
7. Moles and Chemical Formulas
8. Energy and Specific Heat
9. Energy and States of Matter
10. Collection of a Gas Over Water
11. Soluble and Insoluble Salts
12. Electrolytes, Solutions, and Concentration
13. Reaction Rates and Equilibria
14. Acids, Bases, Buffers, and pH
15. Acid-base Titration

Suggested Reading Other Than Required Textbook

Review of pre- and Beginning algebra techniques. Looking up physical data online and in Chemical Reference texts.

Examples of Required Writing Assignments

Brief essays on chemical concepts on exams. Explanation of laboratory results.

Examples of Outside Assignments

Students will analyze data pertaining to ionization energies to explain trends in ions formed.
Student will utilize atomic masses and reaction stoichiometry to calculate reaction yields.
Students will use algebraic manipulations and data pertaining concentrations to predict the direction a reaction will proceed.
Students will use the lab guide to prepare "prelab" summaries.

Instruction Type(s)

Lab, Lecture, Online Education Lab, Online Education Lecture

IGETC Area 5: Physical and Biological Sciences

5A. Physical Science, 5C. Science Laboratory