CHEM C110: INTRODUCTION TO CHEMISTRY

Item	Value
Curriculum Committee Approval Date	04/26/2024
Top Code	190500 - Chemistry, General
Units	5 Total Units
Hours	126 Total Hours (Lecture Hours 72; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Local General Education (GE)	• CL Option 1 Natural Sciences (CB1)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A) • Cal-GETC 5C Laboratory Activity (5C)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A) • IGETC 5C Laboratory Activity (5C)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1) • CSU B3 Laboratory Activity (B3)

Course Description

A lab science course in principles of inorganic, biochemistry, and organic chemistry for transfer and for associate degree programs in nursing, dietetics, paramedical, and other allied health fields. Familiarity with Elementary Algebra is required. Not for students planning to take CHEM C130. Transfer Credit: CSU; UC: Credit Limitations: no credit for CHEM C110 if taken after CHEM C180 or CHEM C220; CHEM C110, CHEM C130, CHEM C140 and PHYS C140 combined: maximum credit, 1 course. PREREQUISITE: A course taught at the level of beginning algebra or appropriate math placement.

Course Level Student Learning Outcome(s)

1. Analyze the fundamental features of inorganic chemistry as they apply to organic and biochemistry including measurement and mathematical interconversion of physical properties such as mass, volume, density, temperature, solutions, and concentrations.
2. Use scientific systems of measurement, scientific symbols, and appropriate terminology to differentiate typical acid and base formulas and compare/contrast behavior associated with acids and bases including buffers.
3. Use laboratory equipment to perform basic chemical experiments and determinations.

Course Objectives

- 1. Solve mathematical problems using chemical relationships
- 2. Represent molecules using Lewis structures and predict their shapes with valence shell electron pair repulsion theory (VSEPR)
- 3. Correctly balance chemical equations and distinguish between different types of chemical transformations
- 4. Relate the structural features of different structural groups and their physical and chemical properties
- 5. Demonstrate knowledge of the major classes of biological molecules

Lecture Content

Matter and measurements Unit conversions, dimensional analysis, significant figures Density; temperature scales Atoms, Molecules, and Ions Atomic symbols; chemical formulas Ionic formulas; covalent formulas Isotopes Radioactivity and radioactive decay Chemical Formulas and Nomenclature Naming ionic compounds Naming covalent compounds Electronic Arrangements Electron Configurations and valence electrons Lewis structure Valence Shell Electron Pair Repulsion Theory (VSEPR) Stoichiometry Balancing chemical equations Moles; molar mass, Thermochemistry Energy Quantitative energy calculations Gas Laws Boyles Law, Charles Law, Avogadros Law, Ideal Gas Law Stoichiometric Gas Law calculations Solutions Molarity calculations Dilution Acids and Bases Definitions of Acids and Bases pH Organic Chemistry Alkanes; general nomenclature Alkenes and their reaction chemistry Arenes and their reaction chemistry Functional Groups Alcohols, Ethers, and Thiols Carbonyls and Carboxylates Carbohydrates Monosaccharides and Disaccharides Chiral Compounds Polysaccharides Lipids Fatty Acids and Triglycerides Steroids Amines, Amino Acids, and Proteins Amine Structures Peptide Bonds Enzymes Nucleic Acids The genetic code and protein synthesis DNA Technology

Lab Content

Laboratory Measurements and Use of Significant Figures Measuring Density of Solids and Liquids Electron configurations of atoms and ions Calorimetry and Heat Transfer Lewis Dot Structures and Valence Shell Electron Pair Repulsion Theory (VSEPR) Stoichiometry: Reaction Ratios and Yield Gas Laws Acids, Bases, and pH Properties of Organic Compounds versus Ionic Compounds Synthesis of Esters from Alcohols and Carboxylic Acids Protein Denaturation: Chemical and Physical methods Enzyme Action: Effects of Temperature, pH and Inhibitors DNA Extraction

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture, demonstrations, problem assignments, laboratory experiments and analysis, experimental simulations and discussion

Reading Assignments

Written explanations of chemistry theory illustrative examples of chemistry in action

Writing Assignments

Explanations of chemical phenomena Lboratory Experiment reports

Out-of-class Assignments

Problem solving exercises Laboratory Experiment reports Simulations

Demonstration of Critical Thinking

Problem solving exercises

Required Writing, Problem Solving, Skills Demonstration

Basic math is used in order to solve problems which involve subatomic particles, the formulas of ionic and covalent compounds, and how to balance the chemical equations. Student will be required to demonstrate a variety of basic laboratory skills, particularly in applying measurements and completing reports on experimental results and analysis.

Eligible Disciplines

Chemistry: Masters degree in chemistry OR bachelors degree in chemistry or biochemistry AND masters degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Ball, D.W., Hill, J.W., Scott, R.J.. The Basics of General, Organic, and Biological Chemistry, 1st ed. Davis, CA: LibreTexts, 2024 Rationale: -

Manuals Resources

1. Marcus, Ted. Catalyst: The Benjamin Cumming Custom Laboratory Program for Chemistry, Pearson Custom Publishing, Legacy , 01-01-2007
2. Dupon, Jean W. CHEM 110 Lab Manual: Observation and Analysis in Chemistry, Creative Commons , 08-26-2022

Other Resources

1. Coastline Library