# CHEM C100: PRINCIPLES OF CHEMISTRY

| Item | Value |
|---|---|
| Top Code | 190500 - Chemistry, General |
| Units | 3 Total Units |
| Hours | 54 Total Hours (Lecture 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),<br>• Pass/No Pass (B) |
| Local General Education (GE) | • CL Option 1 Natural Sciences (CB1) |
| California State University General Education Breadth (CSU GE-Breadth) | • CSU B1 Physical Science (B1) |

## Course Description

This course introduces students to basic concepts of chemistry and requires analyses of the socio-cultural contexts within which chemistry plays a central role. The course is designed to provide a general educational exposure to the physical sciences, specifically chemistry, and is not recommended for science majors. Transfer Credit: CSU; UC.

## Course Level Student Learning Outcome(s)

1. Use critical thinking and problem-solving skills to explain natural phenomena, compare and contrast roles of biomolecules in living organisms such as nucleic acids (DNA, RNA), proteins, and fatty acids.
2. Support opinions and ideas regarding Chemistry's place in life and the environment using solid research review, observations, reasoning, and the scientific method.

## Course Objectives

- 1. Apply scientific reasoning in contexts involving chemistry and society.
- 2. Use chemical theories, principles, and models, in conjunction with the scientific method, to analyze socio-cultural phenomena involving chemistry and society.
- 3. Critique the benefits and limitations of applying the scientific method to problems in the analysis of socio-cultural phenomena involving chemistry.
- 4. Explore independently contemporary topics in which chemistry has a significant role.

## Lecture Content

INTRODUCTION TO THE PROCESSES OF SCIENCE Scientific method Matter and energy Introduction to the fundamental particles (electrons, protons, and neutrons) and their relationship to atomic structure Atoms, ions, and molecules Fundamentals of Chemistry: Measure light, heat, and temp Problem Solving and Dimensional Analysis INTRODUCTION TO CHEMISTRY Atoms and their structure Atomic bonding Ionic Interactions and Covalent Bonding Compounds and molecules The states of matter the nature of solutions including classifications of solutes CHEMICAL REACTIONS AND CALCULATIONS KINETICS: RATE OF REACTIONS AND CHEMICAL EQUILIBRIUM ACID/BASE CHEMISTRY RADIOACTIVITY AND NUCLEAR REACTIONS Uses of nuclear power Disadvantage of nuclear power ELECTROCHEMISTRY ORGANIC CHEMISTRY Types of organic molecules Polymers Proteins, fats, and carbohydrates Chemicals in our foods and food supply chain METABOLISM - BIOCHEMISTRY Aerobic Anaerobic VITAMINS AND MINERALS NUCLEIC ACIDS DNA RNA Diseases of chemical origin SPECIAL TOPICS Food additives Water and air pollution Liquids, solutions, and detergents Waste treatment and pesticides Chemistry and chemical dependency Lightning the human environment Human Mobility: Ships, planes, trains, automobiles, and bicycles. Energy: Sources of Energy Distribution, impact on the human condition, and production of oil-based materials Population Dynamics (Chemistry of Contraception) The Politics of Pollution (water-based pollution concerns)

## Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)

## Instructional Techniques

Lecture, demonstration, problem assignments and discussion

## Reading Assignments

Written assignments, discussions, challenging problems, and homework.

## Out-of-class Assignments

Problems and discussions based on library assignments

## Demonstration of Critical Thinking

The solutions of the sample problems strengthen critical thinking skills and illustrate the breakdown of a word problem into the components required to solve it.

## Required Writing, Problem Solving, Skills Demonstration

Some homework will contain problem-solving exercises.

## 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 Timberlake. Chemistry: An introduction to General, Organic, and Biological Chemistry, 13th ed. Pearson, 2018 Rationale: -

## Other Resources

1. Coastline Library