Course Information Form (CIF)

Course Code: CHE 104 (IAI P1 903L)
Course Title: Chemistry of Everyday Life

Department: Natural Sciences
PCS Code: 1.1 - Baccalaureate/Transfer
CIP Code: 40.0501
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 3-3-4
Credit Hour Distribution:

Lecture: 3	Lab: 3	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Introduction to chemical concepts through application to common activities in everyday life and modern issues. One-semester survey for non-science majors.

General Course Objectives

Introduce chemical concepts using everyday activities as examples to fulfill the following goals:

- increase scientific literacy in a general population of students;
- increase an appreciation of and enjoyment for scientific endeavors among a general population of students;
- create an environment that illustrates the importance of chemistry as an experimental science through experiments and by evaluating current issues associated to chemistry; and
- identify and describe physical phenomena in everyday products, activities, and events.

Minimum Placement Levels

English	Reading	Math
None	Placement out of CCS 098	None

Prerequisites

None

Methods of Evaluation

10-14 laboratory reports, 10-14 quizzes, 8-14 reading and homework assignments, 1 midterm examination, 1 cumulative final exam, 1 research project, and 10-14 discussion forums.

Instructional Materials and Additional Supplies

Beginning Chemistry, Ball, June 30, 2021. https://chem.libretexts.org/@go/page/64001
Safety goggles ($12) and supplies for kitchen laboratory experiments (variable).

Course Content

General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Global Awareness and Cultural Reasoning: Students will demonstrate their understanding of global issues, gender and sexual orientation, and multicultural perspectives.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 0, Chapter 0 - Course Introduction	1. Be introduced to the course and all course assignments. 2. Identify how chemistry relates to own everyday life and future career. 3. Learn about the different career options a degree in chemistry opens. 4. LAB: Outline all safety policies and procedures about performing laboratory experiments at home using household chemicals and equipment.	3	3	0
Module 1, Chapter 1 - Foundations	1. Define matter. 2. Define physical and chemical properties. 3. Categorize properties as physical or chemical, and categorize processes as physical or chemical. 4. Define substances, elements, and compounds. 5. Categorize matter into substances, elements, and compounds. 6. Define homogeneous and heterogeneous mixtures. 7. Classify mixtures as homogeneous and heterogeneous mixtures. 8. Classify elements as metals, non-metals, and metalloids (or semi-metals). 9. Define the scientific method. 10. Describe each step of the scientific method and its importance in science. 11. List the similarities and differences between scientific theories and laws. 12. Define quantitative and qualitative observations. 13. LAB: Study how cooking relates to chemistry. 14. LAB: Explore some of the chemical reactions involved in cooking.	3	3	0
Module 2, Chapter 2 - Measurement	1. Write numbers using standard and scientific notation. 2. Interconvert numbers between the two notations. 3. Define significant units. 4. Recognize the number of significant units in a given number. 5. Correctly limit mathematical results to the proper number of significant figures. 6. Identify the most common International System of Units (SI) and English Units. 7. Express numbers with correct full and abbreviated units. 8. Convert measurements between units. 9. Convert values between different units using conversion factors. 10. Identify the most common temperature scales. 11. Interconvert temperature values between different scales. 12. Define density and use it as a conversion factor. 13. LAB: Explore the concepts of density by creating solutions with different densities. 14. LAB: Explain how density affects whether items sink or float in a solution.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 3, Chapter 3 - Atoms, Molecules, and Ions	1. List the main principles stated by the modern atomic theory. 2. List and describe the main three subatomic particles (protons, neutron, and electrons) and the main parts of an atom (nucleus and electron clouds). 3. Define atomic number, mass number, and isotopes. 4. Recognize the names and symbols of common elements. 5. Explain how elements are rearranged in the periodic table. 6. Define molecule. 7. Name simple molecules based on their formulas, and determine their formula based on their name. 8. Know the prefixes for 1 to 10 atoms. 9. Calculate the mass of an element or molecule. 10. Explain how ions and ionic compounds are formed. 11. Construct a proper formula for an ionic compound and generate a proper name for an ionic compound. 12. LAB: Perform a type of chromatography to separate different components from a mixture. 13. LAB: Identify substances and homogeneous and heterogeneous mixtures, and explain how each mixture can be separated.	3	3	0
Module 4, Chapter 4 - Chemical Reactions and Equations	1. Define and identify all parts of a chemical equation. 2. Balance chemical equations. 3. Classify chemical reactions as single or double replacement. 4. Complete single and double replacement reactions. 5. Identify a precipitation reaction. 6. Use the solubility rules to identify precipitates. 7. Identify composition (synthesis), decomposition, and combustion reactions. 8. Identify acids and bases. 9. Identify a neutralization reaction and predict its products. 10. Define oxidation and reduction. 11. Assign oxidation numbers to atoms in simple compounds and recognize oxidation-reduction reactions. 12. LAB: Study the reaction of browning of fruits and vegetables as a type of redox reaction. 13. LAB: Test how acids, bases, and other substances can increase or decrease the rate of the reaction.	3	3	0
Module 5, Chapter 5 - Stoichiometry and the Mole	1. Define stoichiometry. 2. Relate quantities in a balanced chemical equation on a molecular basis. 3. Define the unit mole. 4. Define molar mass. 5. Calculate the molar mass of a compound. 6. Relate moles of a compound to mass in grams of a compound and vice versa. 7. Use the balanced chemical equation to construct conversion factors in terms of moles. 8. Calculate moles of one substance from moles of another substance using a balanced chemical equation. 9. From a given number of moles of a substance, calculate the mass of another substance involved using the balanced chemical equation and vice versa. 10. Define limiting reagent. 11. LAB: Study the chemical reaction involved in baking cupcakes and test how omitting certain ingredients can affect the outcome of the reaction.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 6, Chapter 6 - Gases	1. Outline the major concepts behind kinetic theory of gases. 2. Relate the general properties of gases to the kinetic theory. 3. Define pressure. 4. Learn the units of pressure and how to convert between them. 5. Learn what is meant by the term gas laws. 6. Learn and apply Boyle's, Charles', and Gay-Lussac's laws. 7. Learn the ideal gas law. 8. Apply the ideal gas law to any set of conditions of a gas. 9. Apply the ideal gas law to molar volumes and density. 10. Learn Dalton's law of partial pressures. 11. Calculate the pressure of a system containing different gases. 12. LAB: Study Boyle's, Charles', Gay-Lussac's, and Avogadro's laws by creating several gadgets with household materials.	3	3	0
Module 7, Chapter 7 - Energy and Chemistry	1. Define energy. 2. Know the units of energy. 3. Understand the law of conservation of energy. 4. Define a type of work in terms of pressure and volume. 5. Define joules, calories, and Calories. 6. Interconvert between common energy units. 7. State and apply the law of conservation of energy. 8. Define enthalpy. 9. Properly express the enthalpy change of chemical reactions. 10. Explain how enthalpy changes are measured experimentally. 11. Perform stoichiometry calculations using energy changes from thermochemical equations. 12. LAB: Study the power of alternative energy by creating and testing a homemade solar oven.	3	3	0
Module 8, Chapter 8 - Electronic Structure	1. Describe light by its frequency and wavelength. 2. Describe the electromagnetic spectrum. 3. Describe the different types of spectra. 4. Describe the Bohr and Quantum Mechanic models of an atom. 5. Learn how electrons are organized in atoms. 6. List and describe the quantum numbers that are assigned to electrons. 7. Represent the organization of electrons by an electron configuration. 8. Identify the electron configurations of the elements with their location on the periodic table. 9. Use the periodic table to identify certain properties of atoms. 10. LAB: Explore how elements emit light by exploring how different cations emit different colors when exposed to a heat source.	3	3	0
Module 9, Chapters 9 - Chemical Bonds	1. Draw a Lewis electron dot diagram for an atom or a monatomic ion. 2. Define and identify ionic and covalent bonds; describe the differences and similarities between them. 3. Draw the Lewis electron dot structure for simple molecules. 4. Define electronegativity and explain how it relates to forming nonpolar and polar bonds. 5. Recognize the three major types of violations of the octet rule. 6. Define VSEPR and use the theory to predict the shape of simple molecules. 7. LAB: Study the strengths of intermolecular forces by creating homemade ice cream.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 10, Chapters 10 and 11 - Solids, Liquids, and Solution	1. Describe the main intermolecular forces. 2. Describe all physical states and physical state transitions. 3. Calculate the energy change associated with physical state transitions using enthalpy values. 4. Define different properties of solutions, such as surface tension, vapor pressure, capillary action, etc. 5. Describe the components of a solution. 6. Define solubility and concentration. 7. Define saturated, unsaturated, and supersaturated. 8. Define and calculate different concentration values such as molarity, parts per million, etc. 9. Describe the process of dilution. 10. LAB: Study the effects of temperature and pressure on the physical state of liquids and solutions.	3	3	0
Module 11, Chapter 12 - Acids and Bases	1. Identify an Arrhenius acid and an Arrhenius base. 2. Identify a Brønsted-Lowry acid and a Brønsted-Lowry base. 3. Write the chemical reaction between an Arrhenius acid and an Arrhenius base. 4. Identify conjugate acid-base pairs in an acid-base reaction. 5. Describe the titration process. 6. Explain what an indicator does. 7. Define a strong and a weak acid and base. 8. Recognize an acid or a base as strong or weak. 9. Define pH. 10. Determine the pH of acidic and basic solutions. 11. Define buffer. 12. Correctly identify the two components of a buffer. 13. LAB: Use natural substances to create a pH indicator. 14. LAB: Use a pH indicator to study the acidity or basicity of household chemicals.	3	3	0
Module 12, Chapter 15 - Nuclear Chemistry	1. Define and give examples of the major types of radioactivity. 2. Define half-life. 3. Determine the amount of radioactive substance remaining after a given number of half-lives. 4. Express amounts of radioactivity in a variety of units. 5. List some applications of radioactivity. 6. Explain where nuclear energy comes from. 7. Describe the difference between fission and fusion. 8. LAB: Explore the job duties of professionals in the field of nuclear chemistry. 9. LAB: Describe the processes that take place in a nuclear plant and a research nuclear reactor.	3	3	0
Special Project	1. Explore the importance of valid scientific research in advertisement.	3	6	0
Midterm and Final Exam	1. Explore chapters 1-6, 7-12, and 15 for chemistry content and its application to everyday life.	3	0	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	45	0