

Cañada College
Official Course Outline

1. **COURSE ID:** CHEM 410 **TITLE:** Chemistry For Health Sciences
Semester Units/Hours: 4.0 units; a minimum of 48.0 lecture hours/semester; a minimum of 3.0 lecture hours/semester; a minimum of 48.0 lab hours/semester; a minimum of 96.0 homework hours/semester
Method of Grading: Letter Grade Only
Prerequisite: MATH 110, or equivalent
Recommended Preparation:
Eligibility for ENGL 100.

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU
AA/AS Degree Requirements:
Cañada GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B1: Physical Science
Cañada GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B3: Lab
CSU GE:
CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B1 - Physical Science
CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B3 - Laboratory Activity

3. **COURSE DESCRIPTIONS:**
Catalog Description:
A survey of basic concepts in general, organic and biological chemistry relevant to the allied health science fields including nursing, radiological technology, respiratory therapy, etc.
Schedule of Classes Description
A survey of basic concepts in general, organic and biological chemistry relevant to the allied science programs.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
Upon successful completion of this course, a student will meet the following outcomes:
 - A. Identify metric units, define and discuss measurement of length, volume, temperature, density of solids, liquids and gases.
 - B. Identify states and classes of matter, describe chemical processes using chemistry terminology.
 - C. Identify and name elements, ionic compounds and covalent compounds and differentiate between symbols and formulas.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
Upon successful completion of this course, a student will be able to:
 - A. Perform simple calculations using the metric system and scientific notation.
 - B. Define and calculate the density of liquids and solids.
 - C. Use chemistry terminology to describe chemical processes.
 - D. Correlate elements and their chemical symbols. Locate elements on the periodic table.
 - E. Write symbols for radioactive isotopes and common radiation types. Write equations for radioactive decay processes.
 - F. Identify biological effects of radiation and ways to protect ourselves against them.
 - G. Recognize medical applications using radioactivity.
 - H. Establish differences between covalent compounds and ionic compounds. Write formulas and name both covalent and ionic compounds.
 - I. Use chemical equations to express chemical changes. Classify chemical changes. Balance chemical equations.
 - J. Define the mole and use the mole relationship in chemical equations to perform simple stoichiometric calculations.
 - K. Identify states of matter, changes of state of matter and the energy changes associated with them.
 - L. Perform simple calculations using heat energy and caloric values.
 - M. Describe the properties of gases and apply them to explain biological processes such as breathing.
 - N. Define solutions and solubility. Identify solute and solvent, electrolytes and non-electrolytes.
 - O. Analyze the factors that affect solubility.

- P. Perform calculations using common units of solution concentration.
- Q. Identify acids and bases. Define pH.
- R. Examine acid-base neutralization reactions and the action of buffers.
- S. Recognize the main functional groups in organic chemistry.
- T. Correlate structure and reactivity of organic compounds. Give examples of the effect of organic compounds in biological systems.
- U. Classify carbohydrates by their structure and function. Identify chiral carbon atoms. Correlate the Fischer projection and cyclic structure of important monosaccharides.
- V. Draw glycoside bonds and perform hydrolysis reactions.
- W. Identify the structures of carboxylic acids, esters, amines, amides. Give examples of their uses in biological systems.
- X. Describe the classes of lipids and their biological significance.
- Y. Define amino acids, peptides, proteins and enzymes. Establish structural differences among them. Indicate their biological significance.
- A@. Describe the metabolic pathways for amino acids, the process of DNA replication and the transcription of the genetic code.

6. COURSE CONTENT:

Lecture Content:

1. Introduction to atoms, elements and the periodic table.
2. Nuclear radiation: detection, measurement, medical applications.
3. Classification of chemical compounds.
4. Chemical reactions: balancing and stoichiometric calculations.
5. Changes of matter and heat energy.
6. Properties of gases.
7. Solutions: preparation, properties, physiological applications.
8. Acids, bases, buffers and the pH scale.
9. Saturated, unsaturated and aromatic hydrocarbons.
10. Alcohols, phenols, ethers, aldehydes and ketones: structure, reactivity and biological significance.
11. Structure and chemistry of carbohydrates.
12. Carboxylic acids, esters, amines and amides: structure, reactivity and biological significance.
13. Lipids: Structure, reactivity and biological significance
14. Amino acids, proteins, and enzymes: structure, reactions, applications.
15. Nucleic acids and the genetic code.
16. Metabolism and energy production.

Lab Content:

1. Introduction to atoms, elements and the periodic table.
2. Classification of chemical compounds.
3. Chemical reactions: balancing and stoichiometric calculations.
4. Changes of matter and heat energy.
5. Solutions: preparation, properties, physiological applications.
6. Acids, bases, buffers and the pH scale.
7. Structure and chemistry of carbohydrates.
8. Carboxylic acids, esters, amines and amides: structure, reactivity and biological significance.
9. Amino acids, proteins, and enzymes: structure, reactions, applications.

TBA Hours Content:

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Honors Content:

1. Nuclear radiation: detection, measurement, medical applications.
2. Chemical reactions: balancing and stoichiometric calculations.
3. Solutions: preparation, properties, physiological applications.
4. Acids, bases, buffers and the pH scale.
5. Structure and chemistry of carbohydrates.
6. Carboxylic acids, esters, amines and amides: structure, reactivity and biological significance.
7. Lipids: Structure, reactivity and biological significance
8. Amino acids, proteins, and enzymes: structure, reactions, applications.
9. Nucleic acids and the genetic code.
10. Metabolism and energy production.

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Other (Specify): Online

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

- A. written laboratory reports
- B. paper - topic is instructor's choice

Reading Assignments:

- A. approximately 1 chapter per week from the assigned textbook

Other Outside Assignments:

None.

To be Arranged Assignments (if applicable):

Not applicable.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Exams/Tests
- B. Home Work
- C. Written laboratory reports. Writing assignment.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Timberlake, K. *Chemistry: An Introduction to General, Organic, and Biological Chemistry*, 10th ed. California, USA: Prentice Hall, 2009

Origination Date: November 2010

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Effective Term: Fall 2012

Course Originator: Jeanette Medina