

Lassen Community College Course Outline

CHEM-45 Introduction to General Chemistry

4.0 Units

I. Catalog Description

This is a survey course in the principals of inorganic chemistry. Including atomic theory, periodic properties, chemical bonds, stoichiometry, gas laws, kinetic and equilibrium, acids and bases, redox reactions, and thermodynamics. This course is recommended for allied health or general education and preparation for major in chemistry. This course is web-enhanced and has been approved for online and hybrid delivery.

Prerequisite(s): One year of high school algebra or Math 60 Intermediate Algebra or equivalent multiple measure placement.

Recommended Preparation: one year high school chemistry.

Transfers to both UC/CSU

CSU GE Area: B1 & B3

IGETC GE Area: 5A & 5C

General Education Area: A

C-ID CHEM 101

51 Hours Lecture, 102 Expected Outside Class Hours, 51 Hours Lab, 204 Total Student Learning Hours

Scheduled: Fall, Spring

II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 190500

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of the course the student will be able to:

1. Demonstrate a basic understanding of the fundamentals of chemistry including the language, laws, theories and processes of chemistry.
2. Apply critical thinking and analytical skills to increase competence in problem solving strategies
3. Develop time management and study habits to enable the mastery of chemistry

B. Course Objectives

Upon completion of this course the student will be able to:

1. Use the metric system of measurement and convert between the metric system of units and any other set of units.
2. Describe the structure of the atom including nuclear structure and electronic configuration.
3. Use the periodic table as a source of information about atomic structure and reactivity.
4. Describe and discuss the nature of compounds and mixtures. Compare and contrast the properties of mixtures and pure substances.

5. Differentiate between ionic and covalent bonding, and discuss similarities and differences between these types of bonding.
6. Predict formulas of the ionic compounds of main group elements and of compounds of these elements and common polyatomic ions.
7. Write, balance, and use chemical equations.
8. Compare and contrast chemical and physical changes of matter and the involvement of energy in these changes.
9. Describe and discuss the states of matter and their characteristics.
10. Do calculations involving moles, density, specific heat, gas laws, energy changes, stoichiometry, molarity, dilution, colligative properties.
11. Understand and use Le Chateliers principle in Acid Base equilibria.
12. Predict and discuss physical properties based on molecular structure and polarity.

IV. Course Content

Lecture Content

1. Introduction to matter and its properties
 - a. Elements
 - b. Structure of atoms
 - c. Electronic structure and properties
2. Nomenclature
3. Measurement
4. Bonding in compounds
5. Chemical reactions and equations
6. Energy and States of matter
7. Gas Laws
8. Stoichiometry
9. Solutions
10. Chemical equilibrium
11. Acids and bases

Laboratory Content

1. Laboratory Techniques
2. Using Physical Properties to Identify an Unknown Liquid
3. Ionic Compound Nomenclature
4. Lewis Structures
5. Types of Reaction
6. Separation of the Components of a Mixture
7. Micro Rocket
8. Water of Hydration
9. Percent Composition of Potassium Chlorate
10. Charles's Law
11. Titration of Vinegar

V. Assignments

A. Appropriate Readings

Standard college level texts and articles from the media.

B. Writing Assignments

Essay examinations and laboratory reports.

C. Expected Outside Assignments

Problem solving by application of chemical principles and computation.
Preparation of laboratory reports. Reading assigned materials.

D. Specific Assignments that Demonstrate Critical Thinking

This course emphasizes observation, synthesis of information to arrive at generalizations, and use of these generalizations as a basis for prediction. Essay examinations, laboratory exercises and reports require these skills.

VI. Methods of Evaluation

Traditional Classroom Instruction

Each student will be given a syllabus at the start of the class that indicates the evaluation tools to be used in the course. The course may include but not constrained to evaluation tools such as homework, quizzes, examinations, essays, laboratory reports, and presentations.

Hybrid Evaluation

All quizzes and exams will be administered during the in person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous will be evaluated for participation and to maintain effective communication between instructor and students. There will also be assignments and activities that students are required to complete in addition to the online assignments and activities.

Online Evaluation

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications.

Web-Enhanced Course Delivery

Same as face to face with additional information and resources made available to students online, and students may be required to do research and complete and/or submit assignments online. Quizzes may be administered online, but exams and summative assessments must be administered face-to-face.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery Correspondence Delivery

Hybrid Delivery Online Delivery

Web-enhanced course

Traditional Classroom Instruction

Lecture, demonstration, multi-media presentation, discussion, laboratory manipulation

Hybrid Delivery

Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction including 100 % of labs will be face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

Online Delivery

Participation in forum based discussions. Online exercises/assignments contained on website. Web based video vignettes with discussion paper, email communications, postings to forums, online lecture notes and web links will comprise the method of instruction.

Web-Enhanced Course Delivery

Same as face to face with additional information and resources made available to students online, and students may be required to do research and complete and/or submit assignments online. Quizzes may be administered online, but exams and summative assessments must be administered face-to-face.

VIII. Representative Texts and Supplies

McMurry et al, *Fundamentals of General, Organic, and Biological Chemistry*, 8th edition; 2017, Pearson, ISBN: 13: 9780134015187.

A Laboratory Manual Book will be prepared and delivered by instructor

IX. Discipline/s Assignment

Chemistry

X. Course Status

Current Status: Active

Original Approval Date: 6/1/1990

Revised By: Yuting Lin

Curriculum/Academic Standards Committee Revision Date: 11/16/2021