MiraCosta College

CHEM 108 - PREPARATORY CHEMISTRY

Units Lecture	3.00	**Units Lab**	0.00	**Units Total**	3.00
Total Hrs Lecture	49.50	**Total Hrs Lab**	0.00	**Total Course Hrs**	49.50

COURSE DESCRIPTION

This course is designed to prepare the science major with the skills and background necessary to succeed in CHEM 110, General Chemistry. The scientific method is used to teach students how theories evolve and how data that supports the theories are acquired and analyzed. It concentrates on developing both analytical and reasoning skills, via problem-solving and establishing cause and effect. Topics include but are not limited to historical development of chemistry, graphing and measurements, dimensional analysis, atomic theory, nomenclature, quantum theory, stoichiometry, chemical reactions, the Kinetic Molecular Theory of Gases, bonding theory, Lewis structures, and the relationship between chemistry and society. (Not open to students with credit in CHEM 110.) UC credit limitation: Credit for CHEM 100, 103, 103L or 108. No credit for CHEM 100 or 103, 103L if taken after CHEM 108 or CHEM 110.

ENROLLMENT RESTRICTIONS

PREREQUISITES	*COREQUISITES*	*ADVISORIES*
MATH 101 or MATH 101B with a grade of "C" or better or qualification through the Math Competency Exam or approved equivalent.	MATH 101 or MATH 101B if prerequisite not met.	None

OUTLINE OF COURSE CONTENT

The course will address the following topics:

Scientific Method: (1)
Measurements and Data: (2)
Nature of chemistry, classification of matter: (2)
Atomic theory, average atomic mass: (2)
Compounds, formulas, naming: (4)
Chemical Reactions and balancing equations: (3)
Stoichiometry: (5)
Gases and Gas Laws: (4)
Solutions, pH and logarithms: (5)
Thermochemistry: 1 (2)
Structure of the atom: (2)
Quantum theory, Bohr theory, electronic configurations: (6)
Bonding and structure: (4)
Nuclear chemistry: (3)
Other topics, including but not limited to: Survey of the elements, Metallurgy,Organic chemistry: (3)

PERFORMANCE OBJECTIVES

Upon successful completion of this course, students will be able to do the following:

At the end of this course students will be able to:

1. Set up and solve chemical problems involving conversion of units, use of formulas, and solving equations for one variable.
2. Graph a data set and derive the equation of a straight line from a graph.
3. Analyze data according to the rules of significant figures.
4. Relate the significance of important historical contributions to the development of current scientific theories as a direct result of the scientific method.
5. Examine the relationship between the chemical principles and their applications to real world dilemmas; such as stoichiometry and manufacturing or pH and pollution.

7. Name simple inorganic compounds according to standard rules of nomenclature.
8. Describe the basic electronic structure of atoms and ions in terms of quantum theory, and use this structure description to predict the properties of individual elements.
9. Arrange elements on the periodic table according to the Law of Periodicity and how it determines trends in the properties of the elements, including predicting the properties of an element based on an analyisis of its position on the periodic table.

READING ASSIGNMENTS
Reading assignments will be consistent with, but not limited by, the following types and examples:

WRITING ASSIGNMENTS
Writing assignments will be consistent with, but not limited by, the following types and examples:

OUTSIDE-OF-CLASS ASSIGNMENTS (READING/WRITING/OTHER)
Outside-of-class assignments will be consistent with, but not limited by, the following types and examples:
Reading Assignments:
Read text and homework assignments
Journal reading - special topics - supplementary texts

Writing, Problem Solving or Performance:
Internet assignments
Collaborative projects

STUDENT LEARNING OUTCOMES

	Learning Outcome	*Mode of Assessment*
1.	Students will analyze and interpret the periodic table to predict and explain an element's physical and chemical properties, based on the concepts of atomic structure, electron configurations and periodic properties.	Written essay question on exam, including cause and effect reasoning. Students will be given a periodic table, and instructed to compare particular property or properties of two or more elements.
2.	Students will construct the Lewis structure of a given molecule or polyatomic ion that obeys the octet rule, and use the Lewis structure to predict the number and types of bonds (single, double or triple) it has, and its geometry, based on the principles of covalent bonding and valence shell electron pair repulsion theory.	Diagram and interpretation problem on exam. Students will be given a periodic table and the molecular formula of a particular chemical species, and instructed to draw its Lewis structure. They will also be directed to analyze this species' Lewis structu
3.	Students will analyze a given chemical reaction, including the amounts of reactants, to write its balanced equation and to calculate the theoretical yield of the products, based on the concepts of molar mass and stoichiometry.	Written problem where students must write and balance the chemical reaction equation in symbol form, based on a written description of the reaction. Students will also construct and perform a calculation to determine the theoretical yield of a product.

METHODS OF INSTRUCTION
Instructional methodologies will be consistent with, but not limited by, the following types or examples:

METHODS OF EVALUATION
Evaluation methodologies will be consistent with, but not limited by, the following types or examples:
Substantial writing assignments which reflect critical and creative thinking:
Written homework
Other - Exams with essay questions requiring the students to link cause and effect.

Computational or non-computational problem-solving or skill demonstrations:
Exams

Homework problems
Quizzes
Class performance

Objective examinations:
Other - Combination

REQUIRED TEXTBOOKS

Examples of typical textbooks for this course include the following:

Author: Zumdahl
Title: Introductory Chemistry
Publisher: HM
Date of Publication: 2004
Edition: 5th
ISBN: 0-61830501-7

OTHER REQUIRED INSTRUCTIONAL MATERIALS

scientific non-graphing calculator

COURSE REPEATABILITY

Total Completions Allowed:	*In Combination With:*
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