

Course discipline/number/title: CHEM 1101: Elements of Chemistry

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 2 lecture, 2 lab
3. Prerequisites (Course discipline/number): MATH 0098 or equivalent
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course is an introductory study of the fundamental laws and theories of chemistry. Content covered includes measurements and precision, unit systems and conversions, the classification of matter, atomic structure, electron configurations and periodicity, ionic and covalent bonding, nomenclature, writing balanced chemical equations, quantitative relationships in chemical systems, solution concentrations, and acid-base reactions.

C. DATE LAST REVISED (Month, year): March, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Chemical Mathematics
 - a) Precision and accuracy of data sets
 - b) Measurements and significant figures
 - c) Unit systems and conversions
2. Matter
 - a) Classification by physical state and by composition
 - b) Atomic theory and structure
 - c) Periodicity and electron configurations
 - d) Ionic and covalent bonding
 - e) Nomenclature of binary and ternary compounds and simple acids
3. Quantitative Relationships
 - a) Formula and molar masses
 - b) Percent composition and Empirical Formulas
 - c) Balanced chemical equations
 - d) Stoichiometry
4. Solutions
 - a) Concentration
 - i. Percentage
 - ii. Molarity
 - iii. Dilution
 - b) Acid-base chemistry

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Use basic chemistry terminology.
2. State modern atomic theory and the use of electronic structure to explain periodicity.
3. Apply chemical laws to predict how a variable may influence a chemical change.
4. Solve chemical problems involving unit conversions, stoichiometric relationships, solution concentrations, and acid-base reactions.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, student's laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.

- F. LEARNING OUTCOMES (MNTC): Continued. . .
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgements.
- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Laboratory reports and/or quizzes.
 2. Tests involving vocabulary, chemical laws, relationships and problem solving.
- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):
The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of the chemicals used during the lab are discussed. The students will be instructed on the proper disposal of any hazardous products. The instructor will direct all students to wear necessary protective equipment while working with chemicals. A copy of Safety Data Sheets (SDS) for Chemicals used is available in the lab.