

CHEM 0003X - PROBLEM SOLVING FOR CHEMISTRY 3A

Catalog Description

Prerequisite: Completion of MATH D or MATH G with grade of "C" or better, or placement by matriculation assessment process, or equivalent

Corequisite: Concurrent enrollment in CHEM 3A

Advisory: Eligibility for ENGL 1A strongly recommended

Hours: 36 lecture

Description: Problem solving course to accompany CHEM 3A. Students use critical thinking and problem solving strategies to solve general chemistry problems in topics that include the mole concept, chemical nomenclature, gas laws, and stoichiometry. (pass/no pass grading) (not transferable)

Course Student Learning Outcomes

- CSLO #1: Solve problems related to chemical formulas, stoichiometry, and thermodynamics.
- CSLO #2: Apply mathematical problem solving techniques to solve problems in chemistry.
- CSLO #3: Develop rules and strategies for problem solving that are effective in solving new sets of problems.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

36

Outside of Class Hours

72

Total Student Learning Hours

108

Course Objectives

1. Solve problems related to unit conversions, atomic structure, the mole concept, stoichiometry, and thermochemistry;
2. Identify by using a diagram, a list, an equation, and/or words, the basic chemical concepts and principles affecting a given chemical system;
3. Build a conceptual model of the given chemical system and explain the system using the model in a written or oral form;
4. Apply mathematical problem solving techniques (algebraic equations, unit factor method, etc.) to solve problems in chemistry; and
5. Develop rules and strategies for problem solving that are effective in solving new sets of problems.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- Not Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: Students will engage in group discussions during problem solving activities, sharing strategies and techniques for solving problems. Their learning will be assessed using formal assessments. For example, "How many molecules are in 76.3 g of dinitrogen tetroxide?"
- Essay Examinations
 - Example: Students will explain aspects the concepts taught on in class assignments, quizzes and exams. For example "explain the difference between mass number and atomic number."
- Objective Examinations
 - Example: Students will be given quizzes and unit examinations throughout the semester, which may include multiple choice, fill in the blank, short answer, essay, and problem solving questions. For example, "Is the density of aluminum metal a physical property or a chemical property?"
- Problem Solving Examinations
 - Example: Students will be given quizzes and unit examinations throughout the semester, which may include multiple choice, fill in the blank, short answer, essay, and problem solving questions. For example, "How many atoms are in 255 micrograms of tin?"

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. A multimedia slide presentation on stoichiometry is used to present the concepts in detail utilizing graphics and video segments for emphasis and clarity. Example problems are demonstrated by the instructor at appropriate times throughout the presentation. Students are always encouraged to ask questions in class or in the LMS discussion board throughout the presentation.

Distance Learning

1. A classroom discussion covering limited reactants is followed by a worksheet that students will complete working in small groups while the instructor roams the room, offering guidance to facilitate learning. In the online modality, this will be accomplished using breakout groups or discussion boards.

Typical Out of Class Assignments

Reading Assignments

1. Read a section from the textbook. Be prepared to use the content to participate in the classroom and to complete assigned problems from the textbook. For example: Read the section on stoichiometry from the textbook. Be prepared to use the content to participate in the classroom and to complete assigned problems from the textbook. 2. Read a sample problem from a handout. For example: Read the example problem on stoichiometry from the handout and be prepared for discussion.

Writing, Problem Solving or Performance

1. Solve problems from textbook problems at end of chapter. For example: Calculate the energy required to raise the temperature of 50 grams of water by 50 K. 2. Solve problems from a worksheet provided in class. For example: How many atoms are in 255 micrograms of tin?

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Chemistry a Molecular Approach
 - Author: Tro
 - Publisher: Cengage
 - Publication Date: 2019
 - Text Edition: 5th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Chemistry and Chemical Reactivity
 - Author: Kotz
 - Publisher: Thomson
 - Publication Date: 2011
 - Text Edition: 8th
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.