

CHEM 0003Y - PROBLEM SOLVING FOR CHEMISTRY 3B

Catalog Description

Prerequisite: Completion of CHEM 3A with grade of "C" or better

Corequisite: Concurrent enrollment in CHEM 3B

Advisory: Eligibility for ENGL 1A strongly recommended

Hours: 36 lecture

Description: Problem solving course to accompany CHEM 3B. Students use critical thinking and problem solving strategies to solve general chemistry problems in topics that include atomic structure, chemical bonding, states of matter, and solutions. (pass/no pass grading) (not transferable)

Course Student Learning Outcomes

- CSLO #1: Solve problems related to gas laws, states of matter and atomic and molecular structure.
- 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 atomic structure, chemical bonding, states of matter, and solutions;
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, "When an electric current is passed through water, the water undergoes a decomposition reaction to produce hydrogen gas and oxygen gas. Using this reaction, what volume of water is required to produce 10.0 liters of oxygen at 760.0 torr and 0.0 °C?"
- Essay Examinations
 - Example: Students will explain the concepts taught on in class assignments, quizzes and exams. For example "Arrange HF, HCl and HBr in order of increasing boiling points and explain your reasoning."
- 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, "What is the term that describes the force of attraction between a liquid and the walls of the container holding the liquid?"
- 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, "A sample of helium gas occupies 18.8 L at 23°C and 0.956 atm. What volume will it occupy at 40°C and 1.20 atm?"

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. A multimedia slide presentation 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 the objective topic 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 can 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 equilibrium 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 a problem on stoichiometry from a handout.

Writing, Problem Solving or Performance

1. Solve problems from textbook problems at end of chapter. For example: A sample of helium gas occupies 18.8 L at 23°C and 0.956 atm. What volume will it occupy at 40°C and 1.20 atm? 2. Solve problems from a worksheet provided in class. For example: If I place 3.00 moles of nitrogen gas and 4.00 moles of oxygen gas in a 35.0 L container at a temperature of 25°C, what will the pressure of the resulting mixture of gases be?

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.