

Course Description**CHM1046L | General Chemistry & Qualitative Analysis Lab | 2.00 credits**

CHM1046L is the second semester general chemistry laboratory course. Students will learn the basic laboratory techniques involved in general chemistry and to reinforce and illustrate several of the important topics in general chemistry (e.g., qualitative and quantitative analysis, equilibrium, thermodynamics, and kinetics). The enrollment generally consists of pre-medical, pharmacy, medical technology, physical therapy, engineering, and science students. Prerequisite: CHM 1045, 1045L; Corequisite: CHM1046.

Course Competencies:

Competency 1: The student will conduct chemistry experiments using proper safety procedures, recognizing and responding appropriately to potentially hazardous situations, and recognizing the necessity of safe laboratory practices by:

1. Recalling the safety rules from CHM1045L and listing new ones that uniquely pertain to CHM1046L.
2. Listing the proper methods for disposal of heavy metal waste, acids, and bases and for handling volatile chemicals.
3. Distinguishing between organic and inorganic waste.
4. Locating and recalling the use of safety equipment such as fire extinguishers, fire blanket(s), eye wash stations, safety showers, spill clean-up kits, etc

Competency 2: The student will be able to communicate (in writing) the chemical laboratory major concepts and themes from information derived from the laboratory and course-related readings by:

1. Utilizing notebook recording skills to document observations, results, and conclusions
2. Completing required laboratory reports, including proper representation of data, analysis of data, and discussion of results.
3. Making graphs of data obtained in the required experiments and obtaining pertinent information from the graphs.

Competency 3: The student will be able to apply appropriate mathematical tools to determine calculated results from experimental data by:

1. Setting up formulas and conversions and properly performing calculations related to the following topics: colligative properties, heat transfer, chemical thermodynamics, chemical kinetics, chemical equilibria, acid-base equilibria, and buffers.
2. Distinguishing between accuracy and precision in measurements. Pursuing high levels of precision, demonstrated by reporting part per thousand and part per million deviations and high levels of accuracy to get results close to accepted values.
3. Recalling how to calculate averages, percent deviations, and other statistical data about measurements.
4. Constructing graphs of laboratory data and evaluating results independently.

Competency 4: The student will be able to build upon basic skills developed in CHM1045L and expand them to include more challenging procedures. by:

1. Interpreting written instructions correctly and independently.
2. Selecting the appropriate glassware and equipment for a specific task.
3. Assembling laboratory apparatus correctly as required for the experiments performed. They are based on the following topics: colligative properties, heat transfer, chemical thermodynamics, qualitative analysis, chemical kinetics, chemical equilibria, acid-base equilibria, and buffers.
4. Performing standard techniques used in classical qualitative analysis, such as mixing solutions, complete precipitation, washing precipitates, centrifuging and decanting, adjusting pH, preparing saturated solutions, and performing flame tests to analyze unknown solutions to identify anions and cations.
5. Distinguishing between objective observation and subjective interpretation of independently obtained individual results.
6. Performing substantial chemical and physical tests to identify an unknown compound by drawing logical conclusions from observed data.

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information