Miami Dade College

Course Description

CHM1045L | General Chemistry and Qualitative Analysis Lab | 2.00 credits

This laboratory course complements the principles of chemistry covered in the CHM1045, providing hands-on experience in applying chemical concepts. Students will engage in practical experiments and data analysis to reinforce their understanding of atomic theory, electronic and molecular structure, measurement, stoichiometry, bonding, periodicity, thermochemistry, nomenclature, solutions, and gas properties. Through these laboratory exercises, students will develop critical thinking skills, learn proper laboratory techniques, and gain experience in scientific reporting. This course is designed to prepare students pursuing science careers with the practical skills necessary for advanced study in chemistry and related fields.

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. Listing the safety rules as provided by the instructor
2. Explaining the importance of the safety rules to maintain a safe environment for students and faculty
3. Locating and describing the use of safety equipment such as fire extinguishers, fire blanket(s), eye wash stations, safety showers, spill clean-up kits, etc
4. Conducting scheduled experiments following the safety rules

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. Maintaining a lab notebook by following the specified format
2. Demonstrating in writing the ability to analyze, evaluate, compare, and extract data relevant to each chemistry experiment
3. Demonstrating the connections among chemical concepts with diagrams, drawings, outlines, concept maps, and other methods
4. Completing required laboratory reports, including proper representation of data, analysis of data, and discussion of results

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

1. Setting up problems and performing calculations related to the following topics: measurements, physical properties, stoichiometry, gas laws, solution chemistry, acid/base chemistry, oxidation/reduction chemistry, atomic structure, and thermochemistry
2. Applying the rules for using significant figures and rounding values as they apply to laboratory data
3. Creates graphs of laboratory data and evaluates the results based on given templates
4. Demonstrating accuracy and precision from experimental data by correctly calculating some or all of the following: average, percent recovery, percent error, average deviation, part per thousand deviation, standard deviation, relative standard deviation, etc

Competency 4: The student will be able to demonstrate laboratory skills in the performance of the experiment by:

1. Discussing the theoretical background for each experiment by reading the material provided, answering assigned open-ended questions, and solving related problems before and after each experiment
2. Identifying and utilizing safety specialized laboratory glassware
3. Assembling laboratory apparatuses required for the experiments performed in this laboratory based on the following topics: measurements, physical properties, stoichiometry, gas laws, solution chemistry, acid/base chemistry, oxidation/reduction chemistry, atomic structure, and thermochemistry
4. Operating specific pieces of laboratory equipment, including balances Bunsen burners, thermometers, hot plates, stir plates, etc
5. Performing specific laboratory procedures such as titrations, filtrations, etc

6. Recognizing the difference between objective observation and subjective interpretation
7. Performing simple chemical and/or physical tests to identify an unknown compound by drawing logical conclusions from observed data

Learning Outcomes

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information