

Miami-Dade Community College
CHM 1045L and CHM 1046L -General Chemistry Laboratory

Course Description: CHM 1045L and CHM 1046L are the first and second semester general chemistry laboratory courses, respectively, designed to introduce students to the basic laboratory techniques involved in general chemistry. It is also the purpose of these courses to re-enforce and illustrate several of the important topics in general chemistry (e.g., stoichiometry, gas laws, atomic structure, qualitative and quantitative analysis, equilibrium, thermochemistry, and kinetics). The enrollment generally consists of pre-medical, pharmacy, medical technology, physical therapy, engineering, and science majors.

2 Credits Each

These courses are not part of the 4,000 word requirement of the Gordon Rule Co-requisites for CHM 1045L: CHM 1045

Prerequisites for CHM 1046L: CHM 1045L & Co-requisites for CHM 1046L: CHM 1046

Course Competencies:

- Competency 1: The student will learn the following cognitive objectives from the laboratory experience by:
- a. Applying the concept of density by experimentally determining the density of specific samples using their mass and volume.
 - b. Applying the concepts of chemical and physical properties and changes by performing experiments that illustrate such properties and changes.
 - c. Applying the concept of chemical stoichiometry by experimentally determining mass-volume, and/or molar relationships of reacting materials and products of reaction.
 - d. Analyzing gas law relationships by experimentally determining pressure, volume, temperature, and quantity and showing their interrelationships.
 - e. Comprehending atomic spectra and their interpretation by experimentally determining the wavelengths of electromagnetic radiation from selected elements and correlating those wavelengths with accepted theoretical structures for atoms.
 - f. Comprehending the relationship of concentrations of solution by mixing solutions and experimentally determining the effect of concentration on quantities of solutions required for completion of reaction.
 - g. Comprehending oxidation-reduction reactions by using redox titrations to determine the percent composition of a specie in an unknown sample.
 - h. Comprehending the concept of heat of reaction by experimentally determining the temperature changes associated with reactions between substances and calculating the heat effects resulting from the reactions.
 - i. Comprehending the concept of heat transfer by experimentally determining specific heat of substances.

- j. Comprehending the concept of the solubility of substances in water by experimentally making a qualitative comparison of the solubility's of different compounds.
- k. Applying the theoretical concepts of the separation of mixtures by using several qualitative techniques such as chromatography and chemical reactions.
- l. Determining the percent composition of unknown samples.
- m. Preparing and standardizing solutions and analyzing samples by performing titration experiments.
- n. Comprehending the concepts of colligative properties of solutions by determining the molecular weight of an unknown compound using freezing point depression.
- o. Analyzing unknown solutions containing anions and/or cations using various experimental methods.
- p. Learning some of the techniques used in classical qualitative analysis such as: mixing of solutions, complete precipitation, washing precipitates, centrifuging and decanting, adjusting pH, preparing saturated solutions, and performing flame tests.
- q. Comprehending the concept of equilibrium by determining equilibrium constants using spectrophotometric methods.
- r. Comprehending the concepts of electrochemistry by determining half-cell potentials.
- s. Comprehending the concepts of kinetics by determining the apparent rate equation of a selected reaction.

Competency 2: The student will perform the following psychomotor objectives:

- a. Using laboratory glassware for volume measurement manipulating instruments, such as pipettes, burettes, and volumetric flasks in a manner that achieves accuracy and precision.
- b. Measuring masses using standard and analytical balances.
- c. Showing proficiency in instrumentation by using instruments such as: spectrophotometers, pH meters, digital freezing point apparatus, and centrifuges.

Competency 3: The student will demonstrate the following affective objectives by:

- a. Displaying a professional attitude and respect for laboratory responsibilities by maintaining the laboratory areas in a clean and neat manner.
- b. Displaying a commitment to safety by following proper laboratory safety procedures.
- c. Demonstrating responsibility by coming to the laboratory prepared to perform all procedures scheduled for the laboratory session.
- d. Appreciating the experimental nature of science by seeing the application of theory in experiments.

