

CHEM 2870 Integrated Chemistry Laboratory II

Course Description:

This laboratory course covers the basic laboratory techniques and essential laboratory safety practices for carrying out analytical and physical chemistry experiments. The experiments provide comprehensive training for students on (1) safe handling of chemical reagents and chemical waste; (2) proper usage of laboratory apparatus and equipment; (3) basic techniques of determination of the properties of pure substances and solutions; (4) common techniques for qualitative and quantitative analysis of real samples; (5) fundamental procedures and techniques to investigate theories with experimental data and results; (6) recording, processing, and reporting experimental data and results, and; (7) conducting search on scientific literature. This course allows students to acquire experiences on fundamental analytical and physical experimental practices.

Experiments (for reference only):

Analytical Chemistry Part:

1. Mohr and Fajans Titrations for Chloride Content Determination
2. Percentage of Iron in Iron Ore by Redox Titration
3. Hardness of Water by Titrimetric Method
4. Potentiometric Titration: Determination of Titratable Acidity in Fruit Juice
5. Determination of Fluoride by Potentiometry using Ion Selective Electrode
6. Coulometric Titration: Determination of Arsenic
7. Electrogravimetry: Determination of Copper Content in Metal Alloy
8. Voltammetric Analysis of Cadmium, Lead and Copper in Water Sample

Physical Chemistry Part:

1. Heat of Combustion
2. Determination of K_{sp} , ΔG° , ΔH° , and ΔS° for Dissolution
3. Ideal-gas Equation
4. Computer Lab: Solving Chemistry Problems with Computer
5. Computer Simulation: Titration Curve
6. Hydrated Metal Ions
7. Density Measurements of Liquid and Determination of Solubility of NaCl
8. Concentration Cell and Determinations of Equilibrium Constants