

Department: Mining Engineering

Division: Mining Exploration and Mineral Processing

Level and Major: BSc, Mining Exploration and Mineral Processing

Course Title: Analytical Methods in Mineral Science

Number of Credits: 1

Prerequisite: Economic Geology+ General Chemistry1

Lecturer: Dr. Amir Reza Azadmehr

Course Goals and Objectives

Fundamental of quantitative and qualitative of chemical analysis - Introduction to analytical chemistry methods in minerals

Course Topics

- Equilibrium, parameters of chemical equilibrium, equilibrium constant, solubility, solubility product
- Mass balance and charge balance in equilibrium, solubility of metal hydroxide, solubility in chelate agents.
- Fundamental of electrochemistry, :reduction and oxidation reactions, galvanic and electrolytic cell, Nernst equation, usage of electrochemical potential for quantitative analysis, equilibrium constant of oxidation and reduction reactions, electrochemical potential and solubility product.
- Electrochemical titration, Oxidation and reduction titration, oxidative and reductive compound in electrochemical titration
- Potentiometry methods, electrodes, indicator electrode, ion selective electrodes, voltammetry method, polarization methods, transformation ion in solution, polarography
- Coulometry and quantitative analysis, coulometry and titration
- Molecular spectroscopy and application Molecular spectroscopy in quantitative analysis, atomic absorption, and application Atomic absorption in quantitative analysis
- Application of XRD, XRF spectroscopy in chemical analysis of minerals.

Reading Resources

- Douglas Skoog and Donald West, Analytical chemistry, Saunders college publishing, 2005