

**Department:** Mining Engineering

**Division:** Mining Exploration and Mineral Processing

**Level and Major:** BSc, Mining Exploration and Mineral Processing

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**Course Title:** Geochemical Exploration 1

**Number of Credits:** 2

**Prerequisite:** Economic Geology+ Engineering Statistics and Probabilities

**Lecturer:** Dr. Ardeshir Hezarkhani

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### **Course Goals and Objectives**

The field of geochemistry involves study of the chemical composition of the Earth and other planets, chemical processes and reactions that govern the composition of rocks, water, and soils, and the cycles of matter and energy that transport the Earth's chemical components in time and space, and their interaction with the hydrosphere and the atmosphere.

### **Course Topics**

- Principles of geochemical exploration- Introducing methods
- Principles of element dispersion in geochemistry - practical concepts
- Migration of the elements and its effective thermodynamic parameters
- Hypogene and supergene environments in hydrothermal deposits (role of pH and Eh)
- Geochemical indices (element distribution and concentration)
- Common decomposition methods in geochemical exploration
- Mine pollutions and their role in creating problem in exploration of hidden deposits

### **Reading Resources**

- Analytical Methods for Geochemical Exploration by J. C. Van Loon and R. R. Barefoot (Dec 12, 1988)
- Drainage Geochemistry (Handbook of Exploration and Environmental Geochemistry) by M. Hale and J.A. Plant (Dec 27, 1994)
- Geochemical Data Analysis, Ardeshir Hezarkhani, Amirkabir University of Technology
- Fractal and Multifractal Modelling of Geochemical Data, Ardeshir Hezarkhani, Amirkabir University of Technology