

Department: Mining Engineering

Division: Mining Exploration

Level and Major: Ph.D., Mining Exploration

Course Title: Environmental Geochemistry

Number of Credits: 3

Lecturer: Dr. Ardeshir Hezarkhani & Dr. Homayoon Katibeh

Course Goals and Objectives

- The more common rock constituents are nearly all oxides; chlorine, sulfur, and fluorine are the only important exceptions to this and their total amount in any rock is usually much less than 1%. F. W. Clarke has calculated that a little more than 47% of the Earth's crust consists of oxygen. It occurs principally in combination as oxides, of which the chief are silica, alumina, iron oxides, and various carbonates (calcium carbonate, magnesium carbonate, sodium carbonate, and potassium carbonate).
- Introduction to groundwater contamination, Different Contaminants and Contamination Sources.

Course Topics

- Environmental Geochemistry Illustration and definitions
- The environmental effects of Fe and its sub-products
- AMDs and their problems within the environment
- Environmental geochemistry of antimony
- Chronic arsenic toxicity and human health Based on Environmental Investigations
- Environmental contamination and health hazard of lead and cadmium around, Mercury Deposits
- Environmental effects of Se Rich Waters
- Mercury Hazards on the people from Au mining areas
- The environmental effects based on U-rich soils
- Urban environmental geochemistry of trace metals
- Petroleum pollutions and its environmental effects
- Natural petroleum dismissed environmental effects
- Energy resources and their environmental effects
- Environmental effects of fertilizers and industrial minerals
- Environmental geochemistry at the global scale
- Introduction to groundwater contamination, Environmental effects of contaminants, Different Contaminants in groundwater, Organic contaminants, Inorganic contaminants, Different contamination sources, Point source pollution, Linear source pollution, Non-point source pollution

Reading Resources

- Physical and Chemical Hydrogeology by Patrick A. Domenico
- Atlas of Eh-pH diagrams Intercomparison of thermodynamic databases Geological Survey of Japan
Open-File Report No.419 National Institute of Advanced Industrial Science and Technology
Research Center for Deep Geological Environments Naoto TAKENO
- Aqueous environmental geochemistry By Donald Langmuir - Prentice Hall (1997) - Hardback - 600 pages - ISBN 0023674121
- Concepts and applications in environmental geochemistry By Dibyendu Sarkar, Rupali Datta, Robyn Hannigan - Elsevier (2007) - Hardback - 761 pages - ISBN 0080465226.