Geochemistry

Course # EAES 2044

Credits 6

Pre-requisites and Co-requisites: Introduction to Earth and Environmental Sciences, Chemistry

Course Description

This interdisciplinary course prepares students to apply the principles of chemistry to explain distribution of different types of elements in the major Earth units such as lithosphere, mantle, hydrosphere and biosphere and the rules controlling elements distribution and exchange in these major units. Students learn how elements are formed in the universe and how they constitute the Earth. Also, they learn thermodynamics of elements in different geochemical systems. Students learn to apply geochemical tools to solve problems of hydrogeology, petrology, sedimentology and environmental science. At the end of the course, students understand the practical applications of geochemistry to the formation of minerals and rocks, water quality and prospecting for ores.

Course Learning Outcomes

Upon completion of the course, students are expected to be able to:

- Discuss common geochemical processes in Earth science.
- Explain elements formation in the universe.
- Explain the geochemistry of lithosphere, mantle and hydrosphere.
- Use geochemical approach to identify minerals and rocks, locate resources such as metal ores, to identify pollutants from aquatic systems.
- Apply isotope geochemistry to solve geological problems.
- Discuss the characteristics of elements and compounds in sediments, soils and water.
- Interpret geochemical data using the appropriate instrumentation and techniques such as pH meter and turbidity meter in the field work and laboratory work.
- Use appropriate laboratory and field equipment and techniques to safely collect samples, measure and analyze data for rocks and minerals (using portable XRF machine) and water samples.
- Recognize appropriate methods to analyze data and evaluate the significance of experimental results.

Course Assessments and Grading

Item	Weight

Active class participation	10 %
Quizzes	15 %
Mid-term exam	15 %
Laboratory report	15 %
Course project	15 %
Final exam	30 %