COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED SCIENCES		
DEPARTMENT	**ENVIRONMENTAL ENGINEERING**		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	GE5510	**SEMESTER OF STUDY**	5^{O}
COURSE TITLE	**ENVIRONMENTAL GEOCHEMISTRY**		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Lectures - preparation and presentation of several topics of the course from students - educational visits to production sites.	**5**	**5.5**

COURSE UNIT TYPE	SC
PREREQUISITES :	Evaluated knowledge of the course "Environmental Geology".
LANGUAGE OF INSTRUCTION/EXAMS:	Greek/English
COURSE DELIVERED TO ERASMUS STUDENTS	YES
MODULE WEB PAGE (URL)	http://geope.teikoz.gr/undergraduate/ug_studies.htm

2. LEARNING OUTCOMES

Learning Outcomes

The geochemistry is a discipline of geological sciences that deals with the study of chemistry of the earth (earth - chemistry). Aim of Geochemistry is:

- Detailed investigation and determination of the occurrence, concentration, spread and distribution of chemical elements and isotopes in the various structural units of the earth,
- Study the laws and rules governing the collection and mobility of various chemical elements in the globe.

Environmental Geochemistry is an area of Geochemistry, which specializes in the practical application of principles, in the search for environmental indicators of environmental contamination from anthropogenic and natural sources, but also for geochemical exploration and identification of ore deposits.

On successful completion of this module the learner will be able to:

1. To comprehend geochemical analysis of soil samples, rock, water, biological materials and air and to be able to identify these elements that are indicators for the existence of mineral deposits.
2. To interpret chemical analysis of rocks and minerals
3. To design and interpret geochemical maps of regions of crucial mineral interest or environmental pollution mainly by leads.
4. To develop geochemical mapping programs for the efficiency and super-efficiency of natural mineral deposits.
5. To apply geochemical research in order to contribute to the protection and restoring of the environment.
6. To contribute to the organization, development and operation of geochemical

laboratories for mineral research and environmental pollution study.

General Skills

Upon successful completion of the programme students will:

-have the basic theoretical and practical knowledge in the fields of the subject area of Geotechnology and Environmental Engineering

-be able to properly apply the theoretical and practical knowledge acquired during the study period

-be able to cover a wide spectrum of scientific and technical knowledge related to mining and geotechnical projects as well as the sector of environmental reclamation

-have gained the necessary competencies to proceed to their second cycle study.

- Independent Work
- Teamwork
- Respect to natural environment
- Search, analyze and synthesize data and information, using necessary technologies

3. COURSE CONTENTS

Theory

- Scope of Geochemistry.
- Geochemical data classification.
- Crystal Chemistry Data.
- Geochemical environment: protogenic – secondary.
- Geochemical dispersion.
- Indexes.
- Rock – soil – river sedimentary – water – vegetation – gas geochemistry.
- Biochemistry: Solid – Liquid – Fuel and Natural gas Geochemistry.
- Geochemistry and Environment.
- The geochemical investigation and its contribution in the environmental protection.
- Analytical Geochemistry (AAS, XRF, NAA, HPLC, GC, ICP-MC, IR-Spectroscopy, UV-Spectroscopy, ect.).

Laboratory

- Geochemical Exploration Methods.
- Statistical Data processing.
- Analytical geochemistry.
- Geochemistry of river sediments.
- Geochemical anomalies.
- Soil geochemistry.
- Biogeochemistry.
- Geochemistry of hydrocarbons.
- Lithogeochemistry.
- Hydrogeochemistry

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	In class rum, Face to face.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Lectures assisting by power point presentations and group comprehension exercises. Educational tours. Contact instructor and students via email.
TEACHING METHODS	***Method description*** / ***Semester Workload*** Classroom lectures: 60 Laboratory exercises: 45 Autonomous study: 15 Total work load hours of lesson: 120
ASSESSMENT METHODS	Written examination on the theoretical background, oral presentations in classroom and assessment of laboratory skills regarding the macroscopic properties of these minerals and the metallographic microscope.

5. RESOURCES

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- Recommended Book Resources:
- Recommended Article/Paper Resources

• Savvidis, G. Serafim, 2013. “Applied, Environmental and Analytical Geochemistry”, 493.

• Kelepertzis, A.E., 2000. “Applied Geochemistry”, 301.• Jensen M. L. & Bateman A. M., 1979 «Economic Mineral Deposits». John Wiley & Sons.

• Stanton R. L., 1972. «Ore Petrology». McGraw-Hill, N. York.

SC: Specialization Courses