

Code: 1695 Geology and Hidrogeology**Degree:** 1st cycle – Environmental Engineering**Curricular Year:** 2nd**Semester Course:** 1st**Credits:** 6 ECTS**Compulsory****Language:** Portuguese/English**Responsible:** Maria Manuela Silva Nunes Reis Abreu**Other lecturer(s):** -**Web Site:** <http://www.isa.utl.pt/home/node/4017>**1. Contact hours:****Lecture/Practicals 70 Others 14 Total 84****2. Objectives:**

The rapid evolution of Agriculture and Industry, due to the growing increase of population and the development of scientific research created some negative impacts in the Earth-System. Consequently, the understanding of the interactions developed between Atmosphere, Geosphere, Hydrosphere and Biosphere is the fundamental objective of this Unity.

3. Programme:**Module I - Geology and Environmental Geochemistry:**

Principles of Geology. Genesis and classification of magmatic, sedimentary and metamorphic rocks. Geologic Time and Stratigraphic Scale for Portugal. Geology and Lithology of Portugal. Geological Cartography. Structure and tectonic.

Environmental Geochemistry: Chemical and structural characteristics of the common solid phases in the weathering crust: silicates; oxides and hydroxides; carbonates; sulphates; chlorides; sulfides. Geochemical behaviour in aqueous solutions of major, minor and trace elements of environmental relevance. Weathering processes and secondary solid phases. Solid-liquid system: reactivity of solid phases relatively to the most common contaminant chemical elements.

Module II - Hydrogeology: Importance of the subterranean water and the role of Geology. Porosity and permeability of the geological formations. Aquifers: type, protection (land use), water quality and quantity. Hydrological classification of the rocks. Hydrological resources in the great Geological (Morphostructural) Portuguese Unities. Aquifer systems in Portugal.

4. Bibliography:**Main Bibliography**

Abreu MM, 2010. AEISA:

Noções de Geologia e Geologia Geral de Portugal.

Caracterização Químico-Estrutural das Fases Sólidas.

Comportamento dos Elementos em Solução Aquosa.

Meteorização e Fases Sólidas Secundárias.

Estrutura e Tectónica. Acetatos das aulas.

Comportamento das Fases Sólidas no Sistema Sólido-Líquido.

Galopim de Carvalho AM, 1996. Geologia. Morfogénese e Sedimentogénese. Univ. Aberta

1997. Geologia. Petrogénese e Orogénese. Univ. Aberta

Marques JM, 2007. Hidrogeologia (Apontamentos IST/UTL). AEISA

Other Bibliography

Bell, FG, 1998. Environmental Geology. Blackwell Science

Galopim de Carvalho AM, 2002. Introdução ao estudo do Magmatismo e das Rochas Magmáticas.

Âncora Editora

Lutgens FK & Tarbuck EJ, 2003. Essentials of Geology. Prentice Hall

5. Assessment:**One test/Module**

A minimum of mark 8/20 in each test.

To exempt the Final Examination is needed a medium mark $\geq 10/20$.

One report and oral presentation (2 students/group): Analysis of a Geological Map (scale 1/50000)

Final Examination: mark $\geq 10/20$ **Final Classification:** 80% Tests or final examination + 20% report and oral presentation.

6. Estimated Workload:

168	Hours
-----	-------

7. Last Update:

12/7/2010
