Geology

Calendar: 2nd day semester

Contact Hours: TP 45h; OT 7,5h

Scientific Area: Geotechnics

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

Give full understanding of the fundamentals of Geology; Show the relevance of natural observation in Geology; Provide knowledge for basic geologic analysis: recognize igneous, sedimentary and metamorphic rocks in hand sample; identify the main deformation structures; and reconstructing geologic history from the stratigraphic record.

Syllabus:

General Geology: Internal structure of the earth. Geological cycle. Earth Magnetic Field. Plate Tectonics.

Seismology. How earthquakes occur. Seismic waves. Mercalli seismic intensity. Richter magnitude. Seismicity in Portugal.

Mineralogy and Petrology: Mineral and amorphous solids. Mineral classification and properties (macroscopic scale). What is a rock? Rock classification. Rock formation processes.

Rock alteration and soil formation: Weathering and Erosion; Mass movements: types and causes.

Structural geology: Stress and strain. Folds and fractures (faults and joints).

Ocean and Continent distribution: morphologic elements; marine regression and transgression.

Introduction to geological mapping. Topographic base map.

Geologic compass and its use.

Stratigraphy: Stratigraphy principles. Geologic history. Geologic time scale.

Geology of Portugal: Fundamental units.

Evidence of the syllabus coherence with the curricular unit's intended learning outcomes:

Subjects and specific vocabulary studied during the semester are essential to make understandable the geologic approaches that the Petroleum Engineer and his team will face.

The student should be able to analyse the basic geologic information. From the first step of evaluation of geologic maps information, trough rock and soil in situ identification, recognition of geologic structures, up to knowledge of the methods to reconstruct geologic history from the stratigraphic record, all are acquired skills when the unit is successfully concluded.

The student will have the possibility to observe rocks and soils as presented without human influence during the field trip.

References:

GROTZINGER, J & JORDAN, T (2010). Understanding Earth — 6ª edição, W. H. Freeman and Company.

Marshak, Stephen (2011). Earth: portrait of a planet – 4ª edição, W. W. Norton & Company, London.

KLEIN, C. — The Manual of Mineral Science —- 22nd ed., John Wiley & Sons, 2002.

COSTA, Isabel — Glossário de Geologia — Geologia, ESTBarreiro/IPS, versão 2010.