

Course Unit	Rock Weathering and Climate	Field of study	Earth Sciences
Bachelor in	Environmental Engineering	School	School of Agriculture
Academic Year	2022/2023	Year of study	1
Type	Semestral	Semester	1
Level	1-1	ECTS credits	6.0
Code	9099-309-1104-00-22		
Workload (hours)	162	Contact hours	T 30 TP - PL 30 TC - S - E - OT 20 O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Felícia Maria Silva Fonseca, Luís de Sousa Costa

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Know physical and chemical processes occurring as a result of atmosphere/hydrosphere/lithosphere/biosphere interactions and that are responsible for soil parent material genesis
2. Handle with meteorological data needed for climate classification
3. Know the effect of pertinent climate element in plant development and in rock weathering
4. Know geodynamic processes, internal (magmatism, metamorphism) and external (weathering, erosion, sedimentation), responsible for actual landforms
5. Handle with Portuguese geological maps and identify main soil parent materials

Prerequisites

Before the course unit the learner is expected to be able to:
Basics of maths, physics, chemistry and biology at secondary school level

Course contents

Weather and Climate: factors of global climate distribution; atmosphere; radiation; temperature (air and soil); air humidity; hydrometeors; wind; evapotranspiration; water balance; climate classification; instruments, data treatment. Geodynamics and Rock Weathering: geodynamics internal (tectonics, seisms, volcanoes, orogeny); and external (erosion forms: water, marine, glacier, wind); rock weathering (factors, processes, products); rock identification; geological maps; basics of geomorphology

Course contents (extended version)

1. Weather and Climate
2. Factors of global climate distribution; Astronomical causes of the meteorological phenomena.
3. Movements of the Land, Latitude; Stations of the year, photoperiod and latitude.
4. Atmosphere: Middle vertical structure; Composition; Variations of temperature and pressure.
5. Solar radiation: radiation and energy; solar Radiation and his propagation in the atmosphere.
6. Swinging of radiation; Sunstroke. Temp. of the ground. Propagation of the energy in the ground.
7. Temperature of the air. Heat and temp; Distribution of the temperatures to the surface of the Earth.
8. Temp of the air and the lively beings. Moisture of the air: Origin and importance. Expression.
9. Distribution of the moisture of the air. Meteors, types classification. Dynamic of the atmosphere.
10. Atmospheric pressure: meaning and variations; wind: causes and principal types.
11. General circulation of the atmosphere.
 - Weather and Climate - Practical
 - Meteorological information: importance, instruments, register and way, publication.
 - Treatment of data and graphic representation of elements of climate: practical exercises.
 - Moisture of the air: measurement, ways of expression, problems.
 - Evaporation and evapotranspiration: associate concepts, evaluation, instruments, estimate.
 - Hydrological swinging: notions, components.
 - Climatic classification: application of the classifications of Koppen and of Thornthwaite.
12. Geodynamics and Rock Weathering
13. Processes of Internal Geodynamics Tectonics of Plates. Evidences and theories of the Tect of Plates.
14. Tectonics plates – characterization, movements, causes and consequences.
15. Seismes: tipology and geographical distribution. Seismic waves. Volcanoes: tipology.
16. Orogeny: theory of the geosinclinal; tectonics of plates and orogeny movements .
17. Orogeny Cycles and geohistory. Processes of External Geodynamics .
18. Hydric continental erosion. Sea erosion. Glacier erosion . Win Erosion .
19. Rock weathering: Concept, Factors and General Aspects of the Process.
20. Basic elements of crystallography. The Products of the Rock weathering.
 - Geodynamics and Rock Weathering - Practical
 - Identification of rocks for macroscopic examination . Rock and mineral.
 - Magmatic, sedimentary and Metamorphic Rocks.
 - Classification, principal groups, observation of hand examples, incident in Portugal.
 - Geological and Litological maps of Portugal.
 - Basic elements of estratigrafy; basic divisions of the geological time.
 - Morfoestrutural Unities of Portugal. Basic notions of descriptive geomorfology .
 - The forms of relief; topographical Profiles; Hydrographic Net.

Recommended reading

1. Gonçalves, Dionísio 1980. Cadeira de Climatologia. IPVR, Vila Real.
2. Yague, F. 1989. Iniciacion a la Meteorologia Agrícola. MAPA/Mundi-rensa, Madrid.
3. Bastos de Macedo, J. M. 1983. Introdução. Meteorização das Rochas. Comportamento e Distribuição dos Produtos. O Solo na Crusta de Meteorização, Instituto Superior de Agronomia, Lisboa. Caps. 1-6.
4. Birot, P. 1981. Les Processus d'Erosion à la Surface des Continents, Masson, Paris.
5. Geiger, R. 1980. Manual de Climatologia. FCG, Lisboa. Peterssen, S. 1976. Introduccion a la Meteorologia, Espasa-Calpe, Madrid.

Teaching and learning methods

Lectures for theory, syllabus and references provided to students at semester start. Practicals for supervised activities, including field and lab work and exercises, guidelines provided during semester. Tutorial support for students during semester, including exams period

Assessment methods

1. Final examination and practice component - (Regular, Student Worker) (Final, Supplementary, Special)
2. Component practice - (Regular, Student Worker) (Final, Supplementary, Special)
- Practical Work - 42%

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

Felícia Maria Silva Fonseca, Luís de Sousa Costa	Tomás de Aquino Freitas Rosa Figueiredo	Artur Jorge de Jesus Gonçalves	Maria Sameiro Ferreira Patrício
06-12-2022	06-12-2022	08-12-2022	19-12-2022