



Study Plan

School: School of Sciences and Technology
Degree: *** TRANSLATE ME: Pós-Graduação ***
Course: *** TRANSLATE ME: Geoarqueologia (cód. 707) ***

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
GEO13668O	Geological Mapping Applied to Archaeology	Geology	6	Semester	156
GEO13679O	Geomorphology applied to Archeology	Geography	3	Semester	78
GEO13680O	Materiais Geológicos e Arqueológicos	Archeology Geo-logy	3	Semester	78
FIS13681O	Geophysics Applied to Archeology	Physics	6	Semester	156
GEO13682O	Sedimentary Processes and Environments	Geology	3	Semester	78
GEO13683O	Pedology applied to Archeology	*** TRANSLATE ME: Ciências do Solo ***	3	Semester	78
HIS10511M	Archaeology – Culture and Context	Archeology	3	Semester	78
HIS13684O	Fieldwork in Geoarcheology I	Archeology Physics Geology	3	Semester	78

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
HIS10512M	Methods and Techniques of Archaeological Excavation	Archeology	6	Semester	156
GEO13685O	GIS Tools Applied to Heritage Studies	Geology	6	Semester	156
GEO13686O	Petrography	Geology	6	Semester	156
GEO13687O	Analysis Techniques in Archeometry	Geology	6	Semester	156
HIS13688O	Seminar in Geoarcheology	Archeology Geo-logy	3	Semester	78
HIS13689O	Fieldwork in Geoarcheology II	Archeology Physics Geology	3	Semester	78

Conditions for obtaining the Degree:

*** TRANSLATE ME: Para aprovação na componente curricular é necessário a aprovação (através de avaliação ou creditação) das seguintes unidades curriculares:

1.º Ano

1º Semestre:

8 UC obrigatórias num total de 30 Ects

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2º Semestre:

6 UC obrigatórias num total de 30 Ects

Program Contents



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Geological Mapping Applied to Archaeology (GEO136680)

Basic principles of cartography, methods and main types of maps. Examples of Portuguese maps.

The shape of the Earth: coordinate systems, projection systems and geographical referencing systems. North geographic, magnetic and cartographic, types of scales, methods of relief representation.

Lithological units and cartographic units. Criteria for the definition of geological boundaries. Lithostratigraphic and chronostratigraphic maps.

Basic principles of stratigraphy. Stratigraphic units used in geological maps. Subdivisions in the system, series and stage. Definition of unit, group, formation, member and layer.

Types of contacts between geological units and associated cartographic patterns: stratigraphic contacts, unconformities, intrusive contacts, faults.

Analysis and interpretation of geological maps. The use of the Explanatory Note of the map. Realization of a final field trip in order to apply concepts acquired throughout the semester.

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Geomorphology applied to Archeology (GEO136790)

Forms of relief that support the landscape (plain, plateau, depression, escarpment, slope, Reading the landscape through hypsometric characteristics, shape of basins and properties of the hydrographic network.

The dynamics of slopes, erosive processes and colluvium production, interaction of slopes with the river system. Interaction of the climatic system in the dynamics of the slopes and in the river system.

Functioning of the river system, processes of aggradation and incision. The morphology of the river channels. Meaning of the change in channel morphology over time (climatic, tectonic and anthropic influences). Main controls of the river system (variations of the base level, tectonics and climate). Formation of river terraces.

River terraces as preservation archives for archaeological finds. Main problems in the use of archaeological findings for dating sedimentary records. The importance of absolute dating in dating sedimentary records.

Karst geomorphology and formation of caves.

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Materiais Geológicos e Arqueológicos (GEO136800)

1 - Introduction to geological processes:

1.1 - Earth dynamics

1.2 – Rock cycle

1.3 - Geological and archaeological, materials

2 - Geological materials:

2.1 - Minerals

2.2 - Igneous rocks

2.3 - Sedimentary rocks

2.4 - Metamorphic rocks

3 - Archaeological materials:

3.1 - Litic materials

3.2 - Ceramic materials

3.3 - Glass and pigments

3.4 – Mortars

3.5 - Metals



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Geophysics Applied to Archeology (FIS136810)

General information about Archaeological problems solved by the Geophysics
Types of geophysical surveys and their limitations
General methods and tools to process and interpret geophysical data: filtering interpolation and gridding
Electric resistivity method
Brief physical foundation of resistivity method
Electric properties of geological rocks and archaeological targets
Electric resistivity survey methods
Analysis of resistivity maps
Quantitative interpretation of resistivity anomalies
Application of resistivity method in archaeology
Ground penetrating radar (GPR)
Physical principles of GPR
GPR survey methods
3-D modeling on practice
Examples of GPR application at various archaeological sites
Magnetometry
Brief physical foundation of magnetometry method
Magnetic properties of geological rocks and archaeological targets
Magnetic and Gradiometric survey methods
Analysis of magnetometry maps
Quantitative interpretation of magnetic anomalies
Application the method in archaeology
Electroma

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Sedimentary Processes and Environments (GEO136820)

Theoretical-practical lessons include the following syllabus: main processes of the Earth's external geodynamics; genetic classification of sedimentary rocks; physical properties of sedimentary rocks; porosity and permeability; diagenesis; weathering as part of erosion; sedimentary transport and flow dynamics in surface processes; erosion, hydrology, and evolution of landforms; regolith and mass movements; depositional environments (continental, transition, and marine); erosion-deposition cycles; sedimentation and evolution of landforms in the Quaternary (control factors: variations in the average seal level and climatic variations); Use of methods to study clastic sediments and carbonated deposits (including deposits at archaeological sites and speleothems) applied to the reconstruction of paleoenvironments.

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Pedology applied to Archeology (GEO136830)

Soil functions and soils in space and time. Soil profile, horizons and materials and their morphology (macro and micro). Soils mineral and organic constituents. Soil chemical and physical properties. Factors and processes of soil formation and evolution. Basics of soil classifications. Soil mapping and soil information systems. Applications of soil science in archaeology: case studies.

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Archaeology – Culture and Context (HIS10511M)



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Fieldwork in Geoarcheology I (HIS136840)

The main programmatic lines are:

- Acquisition of basic content on topography;
- Acquisition of basic content on geophysics;
- Knowledge and skills related to fieldwork;
- Data interpretation and reporting.

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Methods and Techniques of Archaeological Excavation (HIS10512M)

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GIS Tools Applied to Heritage Studies (GEO136850)

1. Introduction to GIS organization and output.
2. New data acquisition and input methods.
3. Thematic maps, buffers, and overlays.
4. Representing results using maps.
5. Rasters, surfaces, and continuous data.
6. Predictive locational modeling.
7. Quantifying patterns.
8. Heritage studies and GIS.
9. Using geophysics tools with GIS.
10. Cost-surfaces and viewshed analysis.
11. Web mapping and outreach.
12. Mobile GIS.
13. Using drones in heritage studies.
14. Study case.

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Petrography (GEO136860)

- 1 - Basic concepts of light, optics, components of the petrographic microscope, optical properties of minerals in the petrographic microscope.
- 2 - Manufacture of thin section and cross sections.
- 3- Main minerals in thin section. Petrography of igneous, sedimentary and metamorphic rocks using conventional microscopy (petrographic microscope).
- 4 - Petrography of igneous, sedimentary and metamorphic rocks and archaeological objects by scanning electron microscopy (SEM / EDS).
- 5 - Image analysis (e.g. quantification of phases and porosities).
- 6 - Integration of petrographic analysis of archaeological materials for the resolution of archaeological problems (e.g. identification and provenance of raw materials, production techniques)



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Analysis Techniques in Archeometry (GEO136870)

Techniques of chemical and mineralogical analysis of archaeological materials contextualized in archaeological issues such as study of provenance, production techniques or production centers. General concepts of Archeometry; Analysis / microanalysis techniques; Sampling and sample preparation; Destructive, micro-destructive and non-destructive analysis; Resolution, precision and sensitivity; Basic principles of electromagnetic radiation, electrons, protons, Xrays, interaction with matter; Scanning electron microscopy combined with microanalysis; Xray diffraction; Mass spectroscopy Mass spectroscopy Fourier Transform Infrared Spectroscopy; micro-Raman Spectroscopy; Thermal analysis; Dating of archaeological materials.

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Seminar in Geoarcheology (HIS136880)

The syllabus contents of this curricular unit are not predefined and result from the themes and research domains that are chosen annually to be discussed with students, in order to provide them with a wide range of knowledge, in order to promote a interdisciplinary knowledge.

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Fieldwork in Geoarcheology II (HIS136890)

The main programmatic lines are:

- Acquisition of basic content on topography;
- Acquisition of basic content on geophysics;
- Knowledge and skills related to fieldwork;
- Data interpretation and reporting.