



**University of Minho**  
**SECOND TERM**  
**PANGEA TRACK/PROFILE: 3 - GEOCONSERVATION**

**TITLE OF UNIT: Geological Itineraries****NUMBER of ECTS: 6**

OPTIONAL or COMPULSORY (if applicable): Compulsory

PREREQUISITES (in term of either skills or knowledge or units to be validated before registration to this course): None

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): field classes and lectures

Number of hours dedicated to lectures, practices, field-excursions, etc: **60**Personal workload (hours expected to be dedicated to, including supervised projects): **168****Description of the course****General aims**

- To plan geological itineraries;
- To adapt geological itineraries to the target audience;
- To assess the value and vulnerability of geosites in selected case-studies;
- To discuss in the field examples of infrastructures and interpretation;

**Expected outcomes (knowledge)**

The learning of general concepts about planning of geological itineraries is expected. In addition, students must master procedures of dissemination and valuation of itineraries, including the definition of objectives, public target, duration, and other factors. The fieldwork that constitutes the major part of this unit will allow students to assess real examples of sites, particularly concerning management and vulnerability.

**Expected outcomes (skills)**

This Unit aims to develop several skills that are important for the development of works and research on geoconservation, namely: i) research and analysis of relevant literature on topics such as geoheritage and public use of sites; ii) critical thinking; iii) analytic ability; iv) capacity to solve problems taking into account the importance of the social context on the success of geoconservation; v) aptitude to develop fieldwork; vi) ability to integrate geoethical principles on fieldwork.

**Content summary**

- Planning geological itineraries - choice of the itinerary, walking tours, bus, adequacy of geological features to the target audience, planning of field activities, logistics and security;
- Presentation of field activities appropriate for education, science and tourism;
- Assessment of scientific, educational and tourism uses of a geosite;
- Visits to geosites: observation and interpretation of geological features, eventually associated with biological and / or cultural contents;
- Field techniques using simple maps, compass, GPS, photography;
- Valuation of routes and places of visitation - bibliography, texts support, audiovisual, interpretation panels, computer tools.

**Person in charge of the unit (first and last name, e-mail)**

José Brilha, [jbrilha@dct.uminho.pt](mailto:jbrilha@dct.uminho.pt)

EVALUATION MODE (final exam, oral defence, report...)	Ratio of the final grade
Class discussions	10%
Individual reports	60%
Oral presentation	30%

**TITLE OF UNIT: Geotourism and Geoparks**

**NUMBER of ECTS: 6**

**OPTIONAL or COMPULSORY (if applicable): Compulsory**



PREREQUISITES (in term of either skills or knowledge or units to be validated before registration to this course): **None**

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): **Lectures and practical classes**

Number of hours dedicated to lectures, practices, field-excursions, etc: **60**

Personal workload (hours expected to be dedicated to, including supervised projects): **168**

## Description of the course

### General aims

- To understand and discuss the concepts of sustainable development, ecotourism and geotourism;
- To identify and discuss the resources for the development of geotourism;
- To identify and discuss strategies and examples for the implementation of geotourism;
- To characterize the different players and the actions of geotourism;
- To know the concept, the goals and the strategies of a geopark;
- To know the values and threats of Geoparks
- To know the UNESCO International Geoparks and Geosciences Programme, the Global Geoparks Network and the Regional networks.

### Expected outcomes (knowledge)

It is expected that students understand the concepts of sustainable development, ecotourism and geotourism, and discuss strategies and examples for the implementation of geotourism and geoparks. Besides, they must know the different geoparks networks and the goals and strategies under the UNESCO Global Geoparks Program, and how to develop a new application.

### Expected outcomes (skills)

This Unit aims to develop several skills that are important for the development of works and research on geoconservation, namely:

- research and analysis of relevant literature on topics such as geodiversity, geoheritage, protected areas, geoparks;
- critical thinking;
- analytic ability;
- capacity to solve problems taking into account the importance of the social context on the success of geoconservation;
- aptitude to develop fieldwork;
- ability to integrate geoethical principles on geoconservation.

### Content summary



## SYLLABUS

- Nature Conservation and Tourism;
- Geotourism, values and threats;
- Geodiversity and the different values of heritage;
- Natural, cultural and geocultural heritage;
- Interpretation of nature;
- Education and geotourism, strategies and examples;
- Marketing strategies in geotourism;
- European Geoparks Network, Global Geoparks Network, and UNESCO Global Geoparks Program;
- Objectives and strategies of Geoparks;
- Geoparks values and threats;
- The implementation of a geopark;
- Educational strategies in geoparks;
- Examples of footpaths and roadmaps in geoparks.

Person in charge of the unit (first and last name, e-mail)

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EVALUATION MODE (final exam, oral presentation, report...)	Ratio of the final grade
Group reports	40%
Oral presentation	40%
Class discussions	20%

**TITLE OF UNIT: Inventorying and Characterization of Geological Heritage**

**NUMBER of ECTS: 6**

**OPTIONAL or COMPULSORY (if applicable): Compulsory**



## SYLLABUS

PREREQUISITES (either in term of skills or knowledge or units to be validated before registration to this course): **None**

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): **Lectures and field work**

Number of hours dedicated to lectures, practices, field-excursions, etc: **60**

Personal workload (hours expected to be dedicated to, including supervised projects): **168**

### Description of the course

#### General aims

- To know the concept of geodiversity, its values and threats, and the role providing ecosystem services.
- To know the concepts of geosite, geodiversity site, geological heritage and geoconservation;
- To know the various techniques to make the inventory of geological sites;
- To quantify the relevance of geosites using various assessment methodologies;
- To know some examples of national inventories of geological heritage.

#### Expected outcomes (knowledge)

Students must learn the principles of inventorying geosites, responding to four basic aspects of an inventory: the type of assets to inventory, value, geographical scope and potential use. It is intended that students become able to perform quantitative evaluation procedures regarding the value (scientific, educational, tourist), vulnerability and potential use of geosites. Finally, it is expected that students know the current status of the national inventory of geosites and the methodology that was used, referring to specific literature and websites that contains a geosite database.

#### Expected outcomes (skills)

This Unit aims to develop several skills that are important for the development of works and research on geoconservation, namely:

- research and analysis of relevant literature on topics such as geodiversity and geoheritage;
- critical thinking;
- analytic ability;
- capacity to solve problems taking into account the importance of the social context on the success of geoconservation;
- aptitude to develop fieldwork;
- ability to integrate geoethical principles on the selection of geological sites.

#### Content summary

- Review of geodiversity concepts.



## SYLLABUS

- The various types of geodiversity values and threats.
- Concepts of geosite and geological heritage.
- The different types of geological heritage (palaeontological, geomorphological, mineralogical...).
- Particularities of both geomorphological and palaeontological heritage.
- The various steps of a geoconservation strategy.
- Inventorying geological heritage at various scales.
- Inventory forms and characterization of geosites.
- Quantification and ranking of geosites.
- Current status of the inventory of geological heritage in several countries and its historical evolution.

**Person in charge of the unit (first and last name, e-mail)**

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EVALUATION MODE (final exam, oral defence, report...)	Ratio of the final grade
Group report	45%
Oral presentation	45%
Class discussions	10%

**TITLE OF UNIT: Management and Valuation of Geological Heritage**

**NUMBER of ECTS: 6**

**OPTIONAL or COMPULSORY (if applicable): Compulsory**

**PREREQUISITES (in term of either skills or knowledge or units to be validated before registration to this course): None**

**MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): Lectures and practical classes**

**Number of hours dedicated to lectures, practices, field-excursions, etc: 60**



Personal workload (hours expected to be dedicated to, including supervised projects): **168**

## Description of the course

### General aims

- To know the principles of nature conservation;
- To understand the relationship between geological heritage and land-use policies and nature conservation;
- To identify types of conservation against various types of threats on geological sites;
- To know methodologies for monitoring the state of conservation of geosites;
- To know the principles of interpretation of Tilden;
- To identify the steps that comprise the planning of a strategy of interpretation;
- To know the specificities for the popularisation of geological heritage;
- To assess strategies of interpretation.

### Expected outcomes (knowledge)

This unit is taught after the unit "Inventory and characterization of geological heritage" since students need the knowledge regarding inventorying of geosites to fully master two other key issues in geoconservation: geosites management and valuation. Concerning management, students must know different types of threats, both natural and anthropogenic, that affect geosites, and the methods to stop or minimize these threats. Regarding valuation of geosites, students will be able to perform geological interpretation, i.e., techniques that should be used in order to "translate" the importance of geological elements for lay people.

### Expected outcomes (skills)

This Unit aims to develop several skills that are important for the development of works and research on geoconservation, namely:

- research and analysis of relevant literature on topics such as geoheritage, conservation and monitoring;
- critical thinking;
- analytic ability;
- capacity to solve problems taking into account the importance of the social context on the success of geoconservation;
- aptitude to develop fieldwork;
- ability to integrate geoethical principles on the management of sites and their interpretation.

### Content summary

- The nature conservation and geoconservation: national and international perspectives.
- The land-use planning and the geoconservation. Methods for preserving geosites.
- Geoconservation particularities of the various types of geological heritage in particular, mineralogical and paleontological.
- Types of geosites conservation against various threats. Tools for monitoring geosites.

## SYLLABUS

- Critical analysis of national and international examples. Concepts of interpretation.
- The principles of interpretation of Tilden.
- Steps for an interpretive planning process.
- Activities and interpretation products (footpaths, panels, brochures, electronic content ...) adapted to a variety of audiences.
- Typology of public specialists and non-specialists. Assessment strategies of interpretation and appreciation.

Person in charge of the unit (first and last name, e-mail)

José Brilha, [jbrilha@dct.uminho.pt](mailto:jbrilha@dct.uminho.pt)

EVALUATION MODE (final exam, oral defence, report...)	Ratio of the final grade
Group report	45%
Oral presentation	45%
Class discussions	10%

**TITLE OF UNIT: Protected Areas and Land-use Planning**

**NUMBER of ECTS: 6**

OPTIONAL or COMPULSORY (if applicable): **Compulsory**

PREREQUISITES (in term of either skills or knowledge or units to be validated before registration to this course): **None**

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): **Lectures and practical classes**

Number of hours dedicated to lectures, practices, field-excursions, etc: **60**

Personal workload (hours expected to be dedicated to, including supervised projects): **168**

**Description of the course**





## General aims

- To know the historical development, principles, legislation and examples of protected areas of global and national significance;
- To know protected areas networks and discuss legislation, values and resources;
- To characterize and understand the most important natural values in protected areas examples.

## Expected outcomes (knowledge)

It is expected that students acquire knowledge on nature conservation and protected areas history, legislation and specificities regarding geoheritage protection and use. They also must know different networks of protected areas and be able to discuss the importance of geodiversity in the establishment of some protected areas.

## Expected outcomes (skills)

This Unit aims to develop several skills that are important for working and research in geoconservation, namely:

- research and analysis of relevant literature on topics such as geodiversity, geoheritage, protected areas, geoparks;
- critical thinking;
- analytic ability;
- capacity to solve problems taking into account the importance of the social context on the success of geoconservation;
- aptitude to develop fieldwork;
- ability to integrate geoethical principles on geoconservation.

## Content summary

- Conservation of natural and cultural values and historical perspective;
- Emergence of the concept of sustainable development;
- Protected Areas in the international context - evolution, examples and perspectives;
- Definition, categories and functions established by the International Union for Conservation of Nature (IUCN);
- UNESCO and World Heritage - the natural values on the World Heritage List (WHL);
- The geological heritage and geoconservation in the WHL;
- Biosphere Reserves, Ramsar sites, Natura 2000;
- Nature conservation and protected areas networks; legislation, development plans and nature conservation, heritage and geoconservation;
- Characteristics and values of the National Parks, Nature Reserves and Natural Monuments;
- Characterisation and values of the Peneda-Geres National Park (Portugal).

## Person in charge of the unit (first and last name, e-mail)



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EVALUATION MODE (final exam, oral defence, report...)	Ratio of the final grade
Reports	60%
Oral presentation	20%
Class discussions	20%