Study Plan

School: School of Sciences and Technology
Degree: *** TRANSLATE ME: Pós-Graduação ***
Course: Advanced Studies in Recovery of Historical Heritage and Urban and Economic Regeneration (cód. 466)

1st Year - 1st Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
HIS10631O	Architectural Heritage Studies	History/Architecture	6	Semester	156
ARQ10632O	Theory of conservation and rehabilitation	Civil Engineering and Architecture	6	Semester	156
ARQ10633O	Project methodology	Civil Engineering and Architecture	6	Semester	156
ERU10634O	Materials and construction techniques	Civil Engineering	6	Semester	156
ECN10635O	Economic management of heritage	Economy	4	Semester	104

1st Year - 2nd Semester

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
ERU10636O	Rehabilitation of indoor environmental quality of buildings	Civil Engineering	6	Semester	156
ERU10637O	Urban infrastructures and facilities in buildings	Civil Engineering	5	Semester	130
ERU10638O	Spatial planning of heritage	Geography	5	Semester	130
ERU10639O	Pathologies and rehabilitation of buildings	Civil Engineering and Architecture	6	Semester	156
ERU10640O	Strategies and Techniques of Inspection, Monitorization and Analysis of Buildings	Civil Engineering	5	Semester	130

***** TRANSLATE ME:Unidades Curriculares Optativas *****

Component code	Name	Scientific Area Field	ECTS	Duration	Hours
ECN10641O	Urban and economic regeneration seminar	Economy	5	Semester	130
ARQ10642O	Seminar of project and the surrounding areas	Civil Engineering and Architecture	5	Semester	130
ERU10643O	Seminar on technology of rehabilitation	Civil Engineering	5	Semester	130

Program Contents

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Architectural Heritage Studies (HIS10631O)

1. The medieval military architecture
1.1 Basic concepts and technical terminology
1.2 The attack and defense of fortifications in the Middle Ages
1.3 The Portuguese fortifications
2. The military transition architecture
2.1 Historical Origins military and Portuguese Examples
3. The bulwarked architecture
3.1 Historical and military origins
3.2 Basic concepts and technical terminology
3.3 The Italian school of fortification (Francesco Marchi)
3.3 The first Dutch method of fortification (Sammuel Marolois)
3.4 The method of Errad Le-Bar-le-Duc
3.5 The method of Pagan
3.6 Methods of Vauban
3.7 The second method Dutch fortification (Van Coheorn)
3.8 The attack and defense of fortifications in secs. XVII and XVIII
4. The Border City-quarter of Elvas and its fortifications (World Heritage)

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Theory of conservation and rehabilitation (ARQ10632O)

Concepts and international standards on the architectural heritage
Doctrinal basis for the conservation, restoration of monuments and urban regeneration: Restoration archaeological Restoration stylistic; Restoration philological, scientific Restoration; Preventive conservation, The Athens Charter of the Restoration (1931), The Athens Charter of Urban and International Congresses Modern Architecture, the evolution of the concept of cultural property in the Hague Convention (1954), the increasing importance given to the historic city, the Venice Charter (1964) and the new concepts of conservation and restoration of architectural heritage, World Heritage Convention (1972), the Year of the heritage and the Congress of Amsterdam: Concept of integrated conservation; Recommendation on the protection of historic and its role in contemporary life (1976); concern for the historic town and the Campaign for the European renaissance city (1981), the international Charter on the protection of historical cities (1987); issues of authenticity and Nara Conference (1994), Charter of Krakow (2000), Recommendation on the historic urban Landscapes (2011).
Framework of the current challenges of rehabilitation of architectural heritage.

Research methodologies documentary
Historical memory: The importance of documentation as a source of information to support the restoration and rehabilitation, research methodologies documentary about buildings and architectural ensembles.
Reading and evaluation of buildings and architectural ensembles

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Project methodology (ARQ10633O)

The project methodology includes the various phases of the diagnostic work of the object of study - building with historical and artistic value or set of buildings - and the presentation of intervention strategies in addressing in particular:

• Characterization historical, architectural, typological, constructive sets of buildings or architectural objects of intervention;
• Characterization and diagnosis of the physical structure of architectural ensembles, including:
Characterization of the urban structure, addressing, in a generic way:
• Housing tenure (and the situation at the property)
• Urban morphology
• Functional Characteristics
• Viewpoints
• Existing equipment
• Road network and traffic
• Public Spaces
• Clearances private
• furniture, etc..);
• Preparation of preliminary report, which must precede any intervention listed buildings of classified or included;
• Study and propose criteria and rehabilitation strategies, including the correction of anomalies:
the appropriateness of the intervention to the cultural interest that underlies the maintenance of the building, including the historical, architectural, artistic, scientific, social or technical;
the compatibility of systems and materials proposed in relation to existing;
Evaluation of the benefits and risks of the proposed works or interventions;
Consequences of the works or interventions on the archaeological heritage;
• Harmonization of functions
• Harmonization of spaces and forms (range, metric, composition and texture)
• Basic rules for the management of world heritage, including:
Preparation of the management plan;
Preparation of the maintenance program;
Development of the urban policies;
Presentation and tourist interpretation.

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Materials and construction techniques (ERU10634O)

1. Construction Materials

2. Traditional civil engineering techniques in military and non-military constructions
2.1. masonry
2.2. floors
2.3. roofing
2.4. mortars and coatings
2.5. other

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Economic management of heritage (ECN10635O)

Economic management models of heritage and valoration heritage models

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Rehabilitation of indoor environmental quality of buildings (ERU10636O)

1. Rehabilitation as a way to provide indoor environmental comfort in buildings.

2. Environmental conditions required to obtain comfort. Thermal, acoustic and visual comfort and indoor air quality.

3. Thermal rehabilitation
3.1 Thermal comfort and energy efficiency.
3.2 Regulation requirements applicable to rehabilitation of existing buildings.
3.3 Diagnosis and intervention methodologies.
3.4 Assessment and energetic techno-economic interventions.

4. Acoustical rehabilitation
4.1 Regulation requirements applicable to rehabilitation of existing buildings.
4.2 Airborne sound insulation.
4.3 Impact sound insulation.
4.4 Room acoustics.

5. Luminic rehabilitation
5.1 Capture, transmition, distribution, protection and control.
5.2 Advanced daylighting systems.

6. Rehabilitation to provide indoor air quality.
6.1 Indoor pollutants sources.
6.2 Strategies to control indoor air quality.
6.3 Ventilation and indoor air quality.

7. Building rehabilitation solutions in order to obtain indoor environmental quality.

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Urban infrastructures and facilities in buildings (ERU10637O)

1. Infrastructure in the city;
- Road network
- Pedestrian Network
- Water supply systems
- Irrigation networks of green spaces
- Drainage systems for sewage and stormwater
- Systems of waste management
- Electrical power systems
- Networks and telecommunication systems
- Gas networks
2. Performance evaluation of infrastructure
3. Planning of rehabilitation
4. Techniques for rehabilitation of infrastructures
5. Sustainable cities.

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Spatial planning of heritage (ERU10638O)

Spatial urban planning and environmental integration.
Infraestructure integration.
Urban transborder network integration.
Function and servicies of new restructured and recuperated heritage pieces.
Legal instruments for spatial planning.
Methodological instruments for spatial planning.
Socioeconomic envioronment at different scales.

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Pathologies and rehabilitation of buildings (ERU10639O)

1. Pathology of buildings in masonry, timber and earth construction
2. Peculiarities of structural functioning
3. Seismic behavior and strengthening
4. Constructive solutions for rehabilitation and conservation
5. Examples for implementing

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Strategies and Techniques of Inspection, Monitorization and Analysis of Buildings (ERU10640O)

This course will address various techniques of survey, inspection and analysis of buildings, for the characterization of the constituent materials of the buildings and their levels of degradation.
Various techniques will be presented for inspection, monitoring and analysis of buildings. Use of non-destructive techniques and semi-destructive.
Testing "in situ"and collection techniques for laboratory testing.
Use of quality control tests in rehabilitation works.

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Urban and economic regeneration seminar (ECN10641O)

1. Project election.
2. Project management orientation.
3. Evaluating the results of the Project.
4. Preparing intruction, bibliography and introduction.
5. Use of the economic strategies and the turistic management for validate the project orientation, management, results and evaluation.

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Seminar of project and the surrounding areas (ARQ10642O)

The seminar will address, from the presentation of concrete cases, the methodologies used in the various phases of the project conservation of cultural heritage, namely:
The collection of data on cultural goods to intervene;
The methods of diagnosis;
The establishment of project objectives of conservation, restoration or rehabilitation;
Intervention strategies;
Setting priorities for action;
Establishing rules edificatory architectural complexes (volumetric, typological, chromatic, constructive, etc..).

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Seminar on technology of rehabilitation (ERU10643O)

Case Study

1 - Identification of key structural elements

2 - Characterization of the major pathologies

3 - Diagnosis: damage assessment, assessment of the state of degradation and causes

4 - Analysis and verification of safety. Inspection, testing and monitoring

5 - Solutions for reinforcement and structural consolidation

6 - Management and inventory. Methodologies and inspection reports. The concept of sustainable intervention

7 - Renewing treatments and protection:

identification of problems to be addressed; characterization of products; treatment methods for application on site, methods of treatment in fabrics