	SUBJECT DESCRIPTION	MODELO PED.013.02
---	----------------------------	------------------------------

<i>Course</i>	Master's degree in civil constructions			<i>Academic year</i>	2021/2022		
<i>Subject</i>	Conservation and rehabilitation of buildings			ECTS	5		
<i>Type of course</i>	Compulsory						
<i>Year</i>	1st	<i>Semester</i>	1º sem	<i>Student Workload:</i>			
<i>Professor(s)</i>	Maria de Jesus de Almeida Leão			<i>Total</i>	140	<i>Contact</i>	45
<i>Area Coordinator</i>	Carlos Gonçalves Rodrigues						

Completed

1. LEARNING OBJECTIVES

Enhancing the acquisition of technical and scientific knowledge in terms of theoretical underpinnings of the level foreseen in the syllabus of the curricular unit, particularly in areas of moisture in the building; pathology building, inspection, diagnosis and building safety.

Development of analytical capacity, understanding and interpretation of phenomena inherent in the behavior of buildings in order to apply the acquired knowledge to solve concrete problems related to the purview of discipline.

2. PROGRAMME

2.1. INTRODUCTION

The conservation and rehabilitation of buildings: introduction and definitions. Considerations about the historical nature and ethics of rehabilitation interventions. General principles to consider when designing an intervention. Letters equity.

2.2. MOISTURE IN CONSTRUCTION

Humidities.

Manifestations.

Equipment to diagnose problems humidities.

Diagnosis.

2.3 CONSTRUCTION OF PATHOLOGY

Notion of life of the structures.

Pathology of materials - stone patología. The degradation of the stone. Methods of preservation.

Pathology of wood. Inspection and assessment of timber structures. Preventive and curative measures.

Pathology of steels.

Pathology of concrete. Reinforcement corrosion induced by carbonation and chloride. Degradation of the concrete.

Anomalies in structural elements. Analysis cases.

Anomalies in non-structural elements, coatings and finishes. Analysis of practical cases.

Pathologies of coatings and finishes.

2.4 REHABILITATION OF BUILDINGS

Materials and technologies for rehabilitation of buildings: materials and traditional techniques.

New materials and new technologies. Repairs and structural abnormalities.

Destructive and nondestructive tests.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The established syllabus allows to the students to develop skills in understand the behavior of buildings, assessment of the condition, through inspections and tests enabling them to assess the safety of the building. It is also an objective of the curricular unit allow the students to propose constructive and rehabilitation solutions.

4. MAIN BIBLIOGRAPHY

Henriques, Fernando M.A.- Humidades em Paredes, LNEC, 1994

Encontro Nacional sobre Conservação e Reabilitação de Estruturas, Lisboa, LNEC, Junho de 2000

1º Encontro Nacional sobre Patologia e Reabilitação de Edifícios, Porto, FEUP, Março de 2003

Ondensa 13788- Quantificação das condensações internas segundo a Norma EN 13788 TRHum98-Quantificação da transferência conjunta de calor e humidade em materiais de construção, baseado no modelo de Luikov – Philip – de Vries

V.P.DE FREITAS E P.PINTO; Nota de Informação Técnica – NIT.002 –LFC – FEUP, 1998

NORMA EUROPEIA EN ISO 13788 – Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – calculation methods, CEN, 2002

QUALITE CONSTRUCTION; les façades en béton brut, Qualitté Construcción, Barcelona, 2005

BROTO, Carles – Enciclopèdia Broto de Patologies de la construcció, Barcelona, 2005


5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The evaluation methodology used will allow the student is the center of learning. Concepts and techniques will be taught in a theoretical way, supported on case studies, which will enable students to acquire the knowledge necessary for its practical application. Will be proposed for practical works students to develop and apply the techniques taught. The practical exercises are subject to discussion and doubts clarified in practical classes.

The course evaluation will be done through a written test (50%) of theoretical and practical nature, without consultation, in which students must obtain a minimum grade of 7.0. May attend the evaluation by students who frequently attended more than 2/3 of classes taught (5%). The assessment is complemented with three practical group work (45%), develop extra class by groups of two students, resulting tracking case studies on topics to propose.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The teaching methodology adopted for the curricular unit has a particular focus on the concept of know how to do. This methodology allows the student the applications, with the

	SUBJECT DESCRIPTION	MODELO PED.013.02
---	----------------------------	------------------------------

presentation of case studies and practical implementation, of the concepts related to conservation and rehabilitation of buildings.

7. ATTENDANCE

3 group work and 45%, 2/3 of attendance to school (5%) in the total value (50%) of the value of discipline.

8. CONTACTS AND OFFICE HOURS

(jleao@ipg.pt; Cabinet 76)

9. OTHERS

Date:

Signature:

Signature:

Area Coordinator

Professor Name