

Conservation and Preventive Maintenance

Academic Year:

2018/2019

Course	Master's degree in Conservation and Rehabilitation				
Scientific Area	Conservation and Rehabilitation				
ECTS Credits	6	Curriculum Unit code	CMP	Year	1
				Semester	2
				Type	Compulsory
Prerequisites					
Contact Hours:					
	Lecture Sessions	Lecture-Practical Sessions	45	Practical and Laboratory Sessions	
	Tutorial	Placement		Seminar	
	Fieldwork	Other	7,5	Autonomous Study	109,5
Responsible	Susana Maria Melo Fernandes Afonso Lucas			Position	Visiting Adjunct Professor
Lecturers				Position	
Learning Outcomes	Notion of lifetime of different equipment and parts of a building. Quantification/estimate in view of risk management with regard to building maintenance. Methods of performance assessment of structural and non-structural parts of buildings: Observation and analysis. Sporadic Maintenance. Strategic Maintenance. Planning and strategies of maintenance intervention. Notion of approach that fit the existing standards and regulations. Project revision stage: Durability / Maintenance. Practical case.				
Syllabus	<p>Chap 1: Useful life: Concepts and criteria. Lifetime prediction methods (lifetime models, performance models, degradation models). Main existing methods for predicting lifetime (deterministic, stochastic and engineering models).</p> <p>Chap.2: Definitions. Agents of deterioration and their control. Decision process. Risk management. Temperature and relative humidity. Construction materials, storage and exposure. Emergency plan. Inspection. Monitoring program.</p> <p>Chap. 3: Procedure and Periodicity for inspections and tests. The importance of harmonization between a Maintenance Manual and the Project established methods in the extension of Buildings lifetime. Practical cases.</p> <p>Chap. 4 - Building Management. Maintenance management.</p> <p>Chap. 5: Terminology, definitions and concepts to be used - NP EN 13306: 2007 Maintenance Terminology, EN 15341, EN 13269, EN13460. Indicators of maintenance management. Calculation of indicators. The maintenance management system.</p> <p>Chap. 6: Development of structural and non-structural maintenance plans-final report. Project revision stage: Durability / Maintenance.</p>				
Teaching Methodologies	Presentation of basic concepts in the approach to the built structures, structural and non-structural component in order to build the knowledge base necessary for the development and application of performance evaluation methods. Use of case studies. Realization of an individual work of elaboration of a structural and non-structural maintenance plan of public building constructed or intervening for less than 20 years - as a practical application component of the theoretical content taught in the Curricular Unit.				
Evaluation	Evaluation Components: Building Characterization: 20%; Definition of areas to be inspected / monitored: 15%; Conservation and Preventive Maintenance Plan: 40%; Presentation of the Plan: 25%. Specifics of the practical work developed by students: in compliance with the objectives listed here, all students within the framework of this UC have the opportunity to develop a proposal for a Conservation and Preventive Maintenance Plan in Building or Public Installation, in the structural and non-structural aspects of the building.				

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<p>Evidence of the syllabus coherence with the curricular unit's intended learning outcomes</p>	<p>Given that the main objective of the course is to acquire knowledge and develop skills that allow the student to perform the performance evaluation of buildings, the proposed syllabus content allows students to provide in-depth theoretical and practical training covering the concepts, decision criteria and methodologies relevant to the maintenance of buildings. It is intended to sensitize students to the integration of the maintenance of the constructions in the phases of project, execution and exploration, characterizing the tools for the practice of regular and timely maintenance actions during the lifetime of the buildings. The theoretical knowledge is concretized in case studies, guaranteeing the professional objective of the discipline.</p>
<p>Evidence of the teaching methodologies coherence with the curricular unit's intended learning</p>	<p>Since the fundamental purpose of the Course is the acquisition of knowledge and development of skills that allow the student to perform a conservation plan and preventive maintenance of buildings, students performing presentation of basic concepts, using case studies, complemented by practical application of knowledge in practical cases, allow the acquisition of knowledge and skills provided in the course. It provides a theoretical depth training and practice. The aim is to enable the student to integrate the maintenance of the buildings in the design phase, implementation and operation, featuring tools for the practice of periodic and timely maintenance actions over the lifetime of buildings.</p>
<p>Bibliography</p>	<p>NP EN13269:2006, Manutenção- instruções para a preparação de contratos de manutenção, CEN, July 2006. ISO (2000) - Buildings and constructed assets - Service Life Planning - Part 1: General Principles. EN13306, Maintenance terminology, CEN, April 2001. EN 13460, Maintenance-Documentation for maintenance, CEN. EN 15341:2007, Maintenance-Maintenance key performance indicators, CEN Cóias e Silva, Vítor, e Iolanda Soares. "A Revisão de Projectos Como Forma de Reduzir os Custos da Construção e os Encargos da Manutenção de Edifícios." "Tecnologias" P&C nº20, out/nov/dez de 2003, VCS & IST ed. ISO 15686-1:2000, Building and constructed assets: Service life planning - Part 1: General principles. International Standard Organization 2000; Genève. Flores-Colen, I., de Brito, J. e Freitas, V., Discussion of criteria for prioritization of predictive maintenance of building façades - survey of 30 experts. Journal of Performance of Constructed Facilities, 24(4), 337-344 (2010).</p>
<p>Observations</p>	