

SUBJECT TEACHING GUIDE

G1183 - Pathology and Rehabilitation of Buildings

Degree in Civil Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Optional. Year 4
Faculty	School of civil Engineering				
Discipline	Optional Subjects: Open to all Itineraries				
Course unit title and code	G1183 - Pathology and Rehabilitation of Buildings				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ESTRUCTURAL Y MECANICA				
Name of lecturer	IGNACIO LOMBILLO VOZMEDIANO				
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Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 2. ALUMNOS DOCTORADO (2068)				
Other lecturers	YOSBEL BOFFILL ORAMA HAYDEE BLANCO WONG				

3.1 LEARNING OUTCOMES
- Knowledge related to the traditional buildings rehabilitation and their pathological processes
- Methodology of investigation of pathological processes
- Identification of the main defects that the traditional constructive elements present
- Identification of the defects' causes: Mistakes in the project, in the construction process, usage of inappropriate materials, incorrect use of the building and/or lack of maintenance
- Ability to recognize, diagnose and analyze problems that appear in existing buildings
- Rehabilitation solutions
- Knowledge related to the main tests used in this field (non and minor destructive tests, monitoring, etc.)

4. OBJECTIVES

- Introduce to the students in the discipline of Building Pathology and Rehabilitation, and its economic importance
- Learn about pathological processes of existing buildings (in their structural elements, facades and roofs).
- Know the methodology of investigation in this field of knowledge.
- Provide knowledge related to the main tests used in this field (non and minor destructive tests, monitoring, etc.).
- Acquire ideas related to the main defects in existing buildings and making possible that the student may plan, with coherence, therapeutical solutions focused on the main problems detected.

6. COURSE ORGANIZATION

CONTENTS	
1	General concepts: Building pathology and rehabilitation. General methodology of investigation.
2	Assessment of existing structures: Propping and bracing systems. On-site inspection. Laboratory testing. Constructions monitoring. Examples of preliminary studies to rehabilitation, and pathology reports.
3	Refurbishment of historical buildings: Foundations. Masonry structures. Timber structures. Examples of studies conducted on buildings.
4	Refurbishment of modern buildings: Concrete structures. Steel structures and cast iron elements. Examples of studies conducted on buildings
5	Other topics

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam	Written exam	Yes	Yes	50,00
Group work	Work	No	No	25,00
Activities carried out in class during the course	Others	No	No	15,00
Class attendance	Others	No	No	10,00
TOTAL				100,00
Observations				
<p>Note: According to RD 1125/2003, the results obtained by the student will be graded according to the following numerical scale from 0 to 10, with one decimal, to which the corresponding qualitative grade may be added:</p> <p>0.0-4.9: Fail 5.0-6.9: Pass 7.0-8.9: Good 9.0-10.0: Outstanding</p> <p>Only for duly justified reasons (e.g. health restrictions) may the examinations be organised remotely, with the prior authorisation of the Dean of the School.</p> <p>In the event that, due to health restrictions, it is not possible to objectively verify that the student is following the course (class attendance), this evaluation component will not be considered, and the percentages will be redistributed among the rest of the components as follows:</p> <p>Written exam: 50%. Group work: 30%. Activities carried out in class during the course: 20%.</p>				
Observations for part-time students				
In the case of part-time course students, the evaluation consists on a written exam.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- ADDLESON Lyall. Fallos en los edificios (Manual de patología de la construcción). Consejo Superior de colegios oficiales de aparejadores y arquitectos técnicos de España.
- CALAVERA RUIZ José. Cálculo, construcción y patología de forjados de edificación. INTEMAC, 4ª ed, Madrid 1988.
- CALAVERA RUIZ José. Patología de estructuras de hormigón. Intemac, 2009.
- CALAVERA RUIZ José. Manual para la redacción de informes técnicos en construcción. Intemac 2009.
- DEPARTAMENTO DE CONSTRUCCIÓN Y TECNOLOGÍA ARQUITECTÓNICAS-UPM (AUTORES VARIOS). Tratado de rehabilitación (5 tomos). Editorial Munilla-Lería (Madrid, 1999).
- ESBERT R.M., ORDAZ J., ALONSO F.J. & MONTOTO M. Manual de diagnosis y tratamiento de materiales pétreos y cerámicos. Col·legi d'Àparelladors i Arquitectes Tècnics de Barcelona (Barcelona 1997).
- FERNÁNDEZ CANOVAS, Manuel. Patología del Hormigón. 2001.
- HEYMAN Jacques. El esqueleto de piedra. Mecánica de la arquitectura de fábrica. Textos sobre teoría e historia de las construcciones. Instituto Juan de Herrera. CEHOPU. CEDEX. Ministerio de Fomento. (1999).
- LÓPEZ COLLADO Gabriel. Ruinas en construcciones antiguas. Causas, consolidaciones y traslados. Ministerio de Obras Públicas y Urbanismo. 2ª ed. Madrid 1976.
- LOZANO APOLO Gerónimo & LOZANO MARTÍNEZ-LUENGAS Alfonso. Curso: Técnicas de intervención en el patrimonio arquitectónico (I: reestructuración en madera; tomo II: reestructuración de edificios de muros de fábrica). Consultores técnicos de construcción, C.B. 1995.
- TRILL John & BOWYER Jack T. Construcción. El caso de la esquina rota y otros problemas constructivos. Una aproximación científica a la patología. Gustavo Gili S.A. Barcelona 1982.
- VARIOS AUTORES. Evaluación de la capacidad resistente de estructuras de hormigón. Intemac, 2007