

COURSE SYLLABUS

Preliminary Studies and Diagnosis According to Construction System Pathologies

1. General Information

Course Title	Preliminary Studies and Diagnosis According to Construction System Pathologies (Support Subject 2)
Thematic Area	Architectural and Urban Built Heritage
Level / Semester	Master 2 (M2) — Semester 3
Teaching Unit	UEF3 (Fundamental Teaching Unit)
Credits / Coefficient	3 Credits / Coefficient 2
Weekly Hourly Volume	3 Hours Total (1h30 Lecture + 1h30 Directed Studies / TD)

2. Course Presentation & Objectives

General Objective

Initiation and acquisition of fundamental knowledge regarding conceptual, methodological, and logistical tools required to perform rigorous structural and material diagnostics on built cultural heritage.

Specific Objectives

- 1. Conservation Diagnostics:** Training students to conduct methodological diagnostic studies on the state of conservation of historical buildings.
- 2. Intervention Strategies:** Introducing architectural, constructive, and structural intervention strategies specifically tailored to classified historical monuments.

3. Course Syllabus & Program Breakdown

Chapter	Main Topics & Core Contents	Practical Applications (TD)
Chapter 1: Preliminary Studies & Research Documentation	• Documentation methodology: written sources, archival maps, surveys, iconographic records. • Critical review of old plans, surveying historical archives, theoretical treatises, and study reports.	Archival analysis & documentary research protocol for a selected historical building.

Chapter 2: Subsurface & Built Heritage Archaeology	• Subsurface Archaeology: Excavation techniques, stratigraphy analysis, sampling, and archaeological interpretation. • Building Archaeology (Archaeology of Architecture): Stratigraphic analysis of standing structures and non-destructive investigation.	Stratigraphic matrix diagramming (Harris Matrix applied to masonry walls).
Chapter 3: Surveying, Graphic Representation & Digital Restitution	• Traditional manual surveys, topographic levelling, photogrammetry, and metrophotography. • Technical drawing, stereotomy, CAD software, 3D restitution, photomontage, and synthetic imaging.	Exercise on 3D photogrammetry processing and historical masonry restitution.
Chapter 4: Sanitary Assessment, Pathologies & Diagnostic Tools	• Inspection & Non-Destructive Testing (NDT) for materials, masonry, timber frames, and load-bearing structures. • Pathology analysis: structural decay, cracking mechanisms, foundation settlements, and environmental hazards.	Field diagnostic report: identifying moisture degradation, stone decay, and structural cracks.
Chapter 5: Conservation & Restoration Techniques	• Emergency shoring, provisional/definitive structural consolidation, stone raking/pointing. • Repair and replacement of timber/stone, anastylosis, cleaning methods, stone ravalement, damp-proofing, and technological integration.	Formulating a conservation matrix & technical specification sheet for a listed monument.
Chapter 6: Cost Estimation & Intervention Management	• Technico-economic assessment of conservation work. • Budget estimation, prioritization of emergency interventions, and management case studies.	Case study: Cost estimation and financial planning for a heritage rehabilitation project.

4. Assessment & Grading Scheme

Assessment Type	Format & Description	Weight / Percentage
Final Theoretical Examination	Comprehensive exam covering theoretical concepts and methodologies	60 %
Continuous Assessment (TD)	Field reports, practical surveying assignments, case study defense	40 %
Total Score	Combined Evaluation	100 %

5. Enriched Bibliography & References

A. Spanish Literature & Reference Manuals (Patrimonio y Patologías)

Monjo Carrió, J. (1998). Tratado de rehabilitación arquitectónica: Patología y técnicas de intervención. Madrid: Editorial Munilla-Lería.

Mas-Guindal Lafarga, A. J. (1999). Procedimientos y técnicas constructivas en el patrimonio edificado. Madrid: Editorial Munilla-Lería.

Calvo Manuel, A. M. (1997). Conservación y restauración: materiales, técnicas y procedimientos. De la A a la Z. Barcelona: Ediciones del Serbal.

González Moreno-Navarro, A. (1999). La restauración objetiva: método C.A.R.M.E.N. para la intervención en el patrimonio arquitectónico. Barcelona: Diputació de Barcelona.

Broto, C. (2006). Criterios y patologías en la restauración arquitectónica. Barcelona: Links International.

REHABEND (2020). Construction Pathology, Rehabilitation Technology and Heritage Management. Euro-American Congress, Granada, Spain.

B. Core Institutional & International References

Verges-Belmin, V., & Bromblet, P. (2001). Technical and Scientific File: Scientific methodology applied to monument conservation. Monumental, Éditions du Patrimoine, Paris, pp. 236-271.

Lorusso, S., & Schippa, B. (1995). Scientific Methodology Applied to Cultural Heritage: Technical and Economic Diagnosis and Evaluation. Rome / Paris.

SFIIC Collective (2001). Preserving Heritage Artifacts: Handbook of Preventive Conservation. Sprimont: Pierre Mardaga Éditeur.

CNAU & French Ministry of Culture (2004). Archaeological Diagnostics in Urban Environments: Objectives, Methods, and Results. Acts of the Tours Round Table.

CATED (1997). Measurement Instruments and Building Diagnostics (C 97). Saint-Rémy-lès-Chevreuse: Technical Assistance and Documentation Center.

ICOMOS (2003). Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage. ICOMOS 14th General Assembly, Victoria Falls.