



## COURSE DESCRIPTION RESTORATION LABORATORY

**SSD: RESTAURO (ICAR/19)**

DEGREE PROGRAMME: ARCHITETTURA (N14)  
ACADEMIC YEAR 2022/2023

### COURSE DESCRIPTION

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### GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: NOT APPLICABLE  
MODULE: NOT APPLICABLE  
CHANNEL: 04 Cognome A - Z  
YEAR OF THE DEGREE PROGRAMME: V  
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I  
CFU: 8

#### REQUIRED PRELIMINARY COURSES

Theories and History of Restoration (Teorie e Storia del Restauro); Fundamentals of Solid Mechanics (Fondamenti di Scienza delle Costruzioni)

#### PREREQUISITES

None

#### LEARNING GOALS

The course aims to provide students with the necessary knowledge to let them face the complexities of the restoration project throughout the adequate understanding of the historic built heritage, autonomously evaluating the processes which determine the built palimpsest, in order to transmit to the future the architecture heritage in its entirety and authenticity and to produce an intermediate-level architectural restoration project according to the current legislation. Students will be provided also with the necessary tools allowing them to analyze autonomously the built heritage and to evaluate the layers of the different interventions of transformation, conservation

and restoration occurred during the centuries.

At the end of the course and after passing the exam, the student will be able to acknowledge the architectural restoration project methodology at different scales, to read and to portray a historical fabric, evaluating autonomously its historical and construction events, its materials and construction techniques, its collapse and decay phenomena, and also its tangible and intangible values, in order to transmit it to the further generations in its material integrity, defining the methodology approaches for its conservation. The student will be able to apply its knowledge in an architectural restoration project culturally aware and technically updated to the different scales of the built heritage.

### **EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)**

#### **Knowledge and understanding**

The student must:

- Show to possess the methodology of the architectural restoration project at different scales, relating to the current disciplinary debate;
- Show the critical understanding methods of the built heritage relating to the historical transformation occurred during time;
- Show to know and portray the cultural values, tangible and intangible, preceding the choices for safeguard, conservation, management and enhancement of the built heritage;
- Show to understand with critical and multidisciplinary approach the survey and diagnosis techniques on the built heritage aimed to the restoration and conservation;
- Show to possess the survey and representation techniques of the construction systems of the historical architecture;
- Show to know the survey and representation techniques of the collapse and decay phenomena on the built heritage;
- Show to know the intervention techniques for restoration and conservation of the built heritage;
- Show to know the current legislation on protection of the built heritage;
- Show to be able to define the project strategies for the enhancement and improvement of use for the built heritage.

The training course, starting from the knowledge the evolving debate on architectural restoration –already studied into its historical aspects in the Theories and History of Restoration course –aims to convey to the student a methodology for the architectural conservation project in its many phases, of survey, of diagnosis, of concept and checking. Through this methods the students acquire the ability to draw up a culturally aware and technically updated project on built heritage.

#### **Applying knowledge and understanding**

The student must show:

- To have developed a critical ability of the built heritage, relating to the history of urban architectural, restoration transformations;
- To be able to apply methods of visual and instrumental investigation for the knowledge of the material, morphological, typological, constructional and structural aspect of the built heritage;
- To know how to use the advanced computer techniques and tools for the critical representation of the heritage in its historical recognition and through its phenomena of instability and decay;

-To know how to develop a restoration, conservation, reuse, enhancement project of the built heritage culturally aware in the line with disciplinary and legislative orientations.

The training course is aimed to transmit the operating abilities necessary to correctly apply the acquired knowledge by the student in the definition of project strategies for the conservation and restoration of the architectural heritage.

## **COURSE CONTENT/SYLLABUS**

### **PART I - PRINCIPLES AND METHODOLOGY OF RESTORATION**

1. From the Charter of Venice to the current orientations of restoration. Definitions of restoration and heritage. What is to be restored. Fundamental principles about restoration: minimal intervention, distinguishability, compatibility, reversibility, respect for authenticity, sustainability. The transition from the notion of historical-artistic monument to that of cultural heritage. The Charter of Venice (1964). The European Charter of Architectural Heritage and the concept of integrated conservation (1975). The current orientations of architectural restoration: pure conservation, buildings maintenance-restoration, critical-conservative restoration.
2. The urban dimension of conservation in Italy between history and current events. References to the evolution of the debate from the nineteenth-century cuttings to the theory of thinning out. The cases of the Renaissance district in Rome and the ancient centre of Bari. Historical centres and post-war reconstruction: the problem of the old-new relationship and the role of Roberto Pane. The activities of ANCSA, the plan of Gubbio. The school of Saverio Muratori and type-morphological restoration: the case of Bologna. The ancient centre of Naples from the years of buildings speculation to the urban and architectural conservation plan of 1971: general criteria and principles. The extension of the perimeter and the current debate about the historic centre of Naples from the ICOMOS (1982) study to the Historical Centre Great Project by UNESCO.
3. The legislative framework about cultural heritage in Italy and the Code of Cultural Heritage and Landscape (D. Lgs 42/2004 and amendments and additions). Outline of history of legislation in Italy. Powers of preservation. The Franceschini-Papaldo Commission and the concept of cultural heritage. The structure of the Ministry. The code of Cultural Heritage and Landscape and its essential elements: cultural and landscape heritage. The protection of contemporary heritage.

### **PART II – RESTORATION PROJECT**

1. Survey for restoration. Methodologies and operating procedures. Direct survey and trilateration: common issues of survey for historical buildings. Indirect survey. Introduction to the most advanced tools for indirect survey: digital photogrammetry, drone photogrammetry and laser scanner survey. Graphic representation techniques: geometric and material survey. Examples.
2. Investigation, testing and monitoring for preliminary knowledge and diagnosis for the restoration project. Destructive, partially destructive and non-destructive tests. Micro-coring, endoscopy, flat jacks, thermography, magnetometry, sonic tests, radiography, gamma rays, reflectography, georadar. Manual and automated monitoring.
3. Functional and regulatory adaptation. Fire prevention and protection. Architectural restoration and installations: electrical and environmental comfort installations. More studies about lighting technology for cultural heritage.

4. Accessibility of buildings and historical sites. Basic concepts: accessibility, visitability, architectural barriers. The regulatory framework about these topics. The Ministry Guidelines to overcome architectural barriers in cultural sites (2008): contents and examples. Criteria about design and management: orientation, overcoming distances, overcoming level and floors differences.

### PART III - CONSERVATION TECHNIQUES

1. Structural issues and crack pattern. Rigid movements in masonry, deformations, injuries. Common crack patterns and their representation. Provisional works.
2. Seismic elements applied to masonry buildings. Earthquakes and seismic classification. Current legislation. Guidelines for seismic risk reduction assessment (2010). Mechanisms of collapse. Seismic adjustment and improvement. Structural design of consolidation measures.
3. Consolidation of land and foundations. Nature of land. Traditional and innovative techniques. Outline of foundation structures. Techniques of foundation consolidation.
4. Consolidation of masonry in elevated. Masonry and masonry fabric: regional types and differences. Elevated elements stratigraphy. Masonry and structural modelling. Traditional and innovative consolidation techniques.
5. Arches, vaults and domes: characterization, static and consolidation. Geometry elements of arches and vaults. Conditions of stability and mechanisms of collapse. Static of domes. Constructive characteristics of vaults and domes. Traditional and innovative consolidation techniques.
6. Wood structures: constructive characteristics and consolidation. Notes about wood as a building material. Diagnostics applied to wood. Wooden slabs: national and regional characteristics. Techniques of floor consolidation. Wooden trusses: constructive characteristics and consolidation techniques.
7. Damp problems in buildings: diagnosis and restoration. Nature, causes and effects of dampness. Diagnostics and survey methodology. Restoration techniques against damp in walls.
8. Conservation of concrete structures: degradation, structural issues and consolidation. Outlines about concrete and physical and chemical degradation causes. Degradation and diagnostics. Consolidation techniques with fiber-reinforced materials.
9. Surface conservation techniques: diagnosis and interventions. The NORMAL Committee and UNI 11182-2006. Characterization of surface alteration and degradation phenomena. Conservative interventions: pre-consolidation, cleaning, consolidation, protection.

### READINGS/BIBLIOGRAPHY

#### Part I

G. Carbonara, *Orientamenti teorici e di metodo nel restauro*, in D. Fiorani (a cura di), *Restauro e tecnologie in architettura*, Carocci, Roma 2009, pp. 15-41.

\* A. Pane, *Questões contemporâneas de restauro: uma reflexão dall'Italia*, in *Questões contemporâneas. Patrimônio arquitetônico e urbano*, a cura di R. Fernández Baca Salcedo e V. Benincasa, Canal6 editora, Bauru (SP, Brasil) 2017, pp. 109-130.

- \* G. Fiengo, *La conservazione dei beni ambientali e le Carte del restauro*, in S. Casiello (a cura di), *Restauro, criteri, metodi, esperienze*, Napoli 1990, pp. 26-46.
  - \* E. Romeo, *Documenti e norme per il restauro architettonico*, in S. Casiello (a cura di), *Restauro, criteri, metodi, esperienze*, Napoli 1990 (Carta di Atene, 1931; Carta italiana del restauro, 1932; Istruzioni del 1938; Carta di Venezia, 1964; Carta italiana del restauro, 1972), pp. 237-240; 252-256.
  - \* A. Pane, *Dal monumento all'ambiente urbano: la teoria del diradamento edilizio*, in *La cultura del restauro. Teorie e fondatori*, a cura di S. Casiello, III edizione, Marsilio, Venezia 2005, pp. 293-314.
  - \* F. De Pieri, *Un paese di centri storici: urbanistica e identità locali negli anni Cinquanta e Sessanta*, in «Rassegna di architettura e urbanistica», 136 (2012), pp. 92-100.
  - \* G. de Martino, *Il centro antico di Napoli. Piano di intervento del 1971*, in M.C. Giambruno (a cura di), *Per una storia del restauro urbano*, Cittàstudi, Milano 2007, pp. 205-212.
- Codice dei Beni Culturali e del Paesaggio* (D. Lgs. 42/2004 e successive modifiche e integrazioni, disponibile on-line su molteplici siti e in numerosissime pubblicazioni).

## **Part II**

- D. Fiorani (a cura di), *Restauro e tecnologie in architettura*, Carocci, Roma 2009.
  - M. De Meo, *Tecnologie per l'uso della fabbrica*, in D. Fiorani (a cura di), *Restauro e tecnologie in architettura*, Carocci, Roma 2009, pp. 335-354.
  - S.F. Musso, *Recupero e restauro degli edifici storici*, EPC libri, Roma 2006 (per la parte sul rilievo).
  - \* A. Pane, *Accessibilità e superamento delle barriere architettoniche negli edifici e nei siti storici: alcuni problemi ricorrenti*, in «Arkos», n.s., a. VI, n. 11, luglio-settembre 2005, pp. 39-46.
  - \* A. Pane, *Dispositivi di collegamento verticale*, in *Conservazione vs Innovazione. L'inserimento di elementi tecnologici in contesti storici*, a cura di D. Concas, Il Prato, Saonara (PD) 2018, pp. 91-106.
- Linee Guida per il superamento delle barriere architettoniche nei luoghi di interesse culturale*, MIBACT 2008 (disponibili sul sito [www.beniculturali.it](http://www.beniculturali.it)).

## **Part III**

- A. Aveta, *Materiali e tecniche tradizionali nel napoletano*, Arte Tipografica, Napoli 1987.
  - A. Aveta, *Consolidamento e restauro delle strutture in legno*, Flaccovio, Palermo 2013.
  - A. Aveta (a cura di), *Restauro strutturale e riduzione del rischio sismico*, Editori Paparo, Napoli 2019.
  - A. Defez, *Il consolidamento degli edifici*, nuova edizione a cura di L.M. Monaco, Liguori, Napoli 2002.
  - D. Fiorani (a cura di), *Restauro e tecnologie in architettura*, Carocci, Roma 2009.
- Linee Guida per la valutazione e riduzione del rischio sismico del patrimonio culturale allineate alle nuove Norme tecniche per le costruzioni*, MIBACT 2010 (disponibili sul sito [www.beniculturali.it](http://www.beniculturali.it)).
- Materiali lapidei naturali ed artificiali. Descrizione della forma di alterazione. Termini e denizioni* (Norma UNI 11182:2006).
- \* The bibliographic material marked with an asterisk is available in pdf on the teaching site in the "teaching material" section.

The volumes that are not marked by an asterisk are available to buy in bookshops and/or can be found in the Central Library of Area Architettura or in the specialized one of History and Restoration "Roberto Pane", both located on the first floor of Palazzo Gravina.

### TEACHING METHODS OF THE COURSE (OR MODULE)

Professor will use: a) frontal lectures approximately 40% of the total teaching hours; b) exercises to improve directly theoretical knowledge approximately 20% of the total teaching hours; c) laboratory to improve applied knowledges approximately 40% of the total teaching hours.

The exercises aim at developing the restoration project of a building or an architectural complex which shows a significant historical stratification and conservation issues requiring restoration.

Students will trainee with direct and instrumental surveys, bibliographical research, surveys - also using the equipment present in the departmental laboratories (eg mlab - Monitoring Laboratory\_Tecnologie per il monitoraggio dell'ambiente costruito). The historic centre of Nola (NA) is the study area for the current academic year 2022-23.

The elaborations required for the exercise to be done by groups of 3-4 students, variable according to the specificity of the individual themes, must follow the list on the Professor's website, also shown during the classes.

### EXAMINATION/EVALUATION CRITERIA

#### a) Exam type

- Written
- Oral
- Project discussion
- Other

#### In case of a written exam, questions refer to

- Multiple choice answers
- Open answers
- Numerical exercises

#### b) Evaluation pattern

To take the exam, the student must have participated in all the laboratory activities and been evaluated positively in the 3 periodic tests, which are placed respectively after the first month of the course, after the second month and at the end of the course.

The exam involves the discussion of the project carried out by the group through the presentation of drawings (which final version has to be also shared in digital and printed version in book A3 paper format at the end of the course) and examination of the acquired knowledges about the topics dealt with during classes, considering the bibliography.

The positive evaluation of the project is essential to be admitted to the oral test. The importance of the project for the final evaluation is equal to 70% of CFU, while that the oral exam is equal to 30% of CFU. The evaluation considers the students' learning level of theoretical topics, the interrelation between conceptual and design components, the ability to display and synthesize and the

interaction level in team-work.