RESTORATION LAB A.A. 2017_18

B018889 - GEOMATIC FOR BUILT HERITAGE CONSERVATION
B018887 - RESTORATION
B018888 - STATIC AND STABILITY OF MASONRY STRUCTURES

The restoration laboratory complements the training experiences by providing information on conceptual stages, working tools, regulatory data, and the significance of and methods for preparing all the phases involved in a modern-day restoration project. Following the theoretical teaching and its application in the field, through visits to restoration sites, individual students prepare a project that is as comprehensive as possible in terms of both the definition of each of its stages, from survey to proposal, and the progression from the general concept to the detailed development of certain parts, elements and construction systems.Specific attention is given to contemporary additions to historical buildings and sites. Educational goals are: to learn how to prepare a restoration project, from the survey to the potential restoration approaches, from structural consolidation to proposals for reusing disused complexes. To prepare for checking regulations and laws governing the technological upgrading of historic architecture in a manner compatible with the existing structures. To be aware of the complexity and uniqueness of restoration issues, particularly in relation to the delicate balance between old and new architecture, old and new materials, and the general issue of contemporary addition while understanding a place's identity, and the requirements of conservation versus free expression.

B018889 - GEOMATIC FOR BUILT HERITAGE CONSERVATION
Prof.Grazia Tucci

The course focuses on issues of Geomatics closely related to historic buildings measurement documentation and associated data representation, in view of their preservation and restoration. Students will be introduced to up-to-date surveying techniques (topography, digital photogrammetry and laser scanning). The course is one of the Restoration Laboratory's modules, and therefore the practical application will cover a common topic.

The course provides the skills required to plan and carry out a metric survey at different scales (from the environmental scale to the object one) and to generate and extract deliverable data to be used in a Cultural Heritage conservation project.

The course consists in theoretical classes followed by demonstrations in the lab and practical training on field. Graphic outputs are obtained with specific software to manage data derived from photogrammetry and laser scanning and process it through 3D modeling.

It should be noted that class attendance and participation are prerequisites for passing the exam. The large area reserved for practical activities provides the opportunity for all students to experience directly the use of modern topographic instrumentation.

The final exam is meant to test the acquaintance gained by the student with the topics covered during the course and to review the training experience and the delivered outputs.

B018887 – RESTORATION
Prof. Michele Coppola, Prof. Susanna Caccia Gherardini

Overview

Restoration is one of the most challenging courses of a degree path. It involves a broad base of knowledge. Appeals to much of the knowledge gained during studies in architecture (and it is affected by their possible deficiencies) and at the same time is addressed to other fields and disciplines, from historical to natural sciences. Like all the architecture projects, the restoration project of an architectural artifacts based on a phase of knowledge that leads to a series of technical and cultural choices. The choices are all the more correct, the more adequate is the stage of preliminary knowledge. If we preserve old building sit is because, in addition to an economic and functional value, they contain cultural elements of which therestorer becomes responsible to the communities to which they belong. From the technical point of view, as a doctor, the restorer makes a diagnosis and focuses the right treatment. He knows methods, techniques and materials suited to treat diseases of the buildings. But this is not enough. From the cultural point of view the restorer reactivates the presence of the building in contemporary life and combines functional, technical, spatial features, with design methods that preserve the values of the building of testimony, of historical document and authenticity.

Learning objectives

The purpose of the course is to implement critical skills and operational tools to stimulate the care process on the existing architecture and to make the right cultural choices. The course will clarify the main phases of a restoration project from the survey to the maintenance: the purpose of the project(technical correctness and cultural value), the project phases, methods to develop the necessary knowledge(the critical tools, cultural and technical). The aim is to implement the capabilities of assessment of the conceptual choices of management of the recognized values of an architectural product. At the end of the lab students must be able to set a correct path of analysis of an existing architecture, a synthesis of his material history and its conservation conditions, as a prelude to the project and the intervention of conservation. A crucial point of this process is to achieve an adequate degree of awareness of the characteristics of the intervention: the operational content and the maininter disciplinary connections, but also its historical and cultural meaning as a contemporary source of growth.

Topics

Building over time. Technological history of architecture

- Archaeology of building materials and history of construction techniques

Introduction to Architectural Restoration

- Definitions and basic concepts. Objectives and application fields.
- Historical overview of conservative theory and practice.
- Cultural and technical nodes of the current debate. Restoration charters. Standards.

Documentation for restoration: data collection, management and interpretation

- Analysis and diagnosis for the restoration project. Direct and indirect sources.

- The on-field data collection. The survey. The sampling methods.

Indirect sources for the historical knowledge of the building

- Historical, bibliographic, archival, iconographic research. Web resources and digital archives.

Direct sources for knowledge and material history of the building

- Survey methods and tools for reading the built heritage
- Analysis of the constructive features and study of building techniques
- Building Archaeology. Stratigraphic method, typological surveys, statistical processing.
- The contribution of applied sciences. Archaeometry
- Criteria for documentation, processing and graphic restitution (thematic mapping)

The restoration project

- The diagnostic project. Investigation techniques for characterization and diagnosis.
- History of degeneration. Indirect sources and material documents.
- Evaluation and monitoring of degenerative phenomena. Monitoring, simulations, models.
- Role and trends of scientific research.
- The project for the materials conservation
- The re-use project and the functional rehabilitation.

Valorization for the architectural heritage

- Musealization of the architectural heritage, virtual heritage and digital fruition.

Teaching methods and didactic activities

The course consists of lectures, visits, exercises and project activities.
Lectures: lectures will be accompanied by conferences on specific issues and case studies.
Visits: study visits are scheduled to sites, monuments and restoration workshops.
Exercises and assignments: training exercises will be held in classroom, outside and at home.
Design activity: all the activities will be addressed to develop a research on an architectural work. Students, individually or in small groups (max 3), will be led to carry on a draft of a restoration project. Individual researches will be regularly checked, also in collective sessions.

Methods of learning assessment

Exercises and assignments will provide an assessment of the learning process of each student. Assessment criteria and results will be constantly communicated and discussed. Conclusive research will be illustrated by: a report on the work done and the results obtained, drawings suitable to describe the essential steps of the investigation and the results of the project process. Detailed information on delivery criteria will be provided during the course. The final exam consists of an interview on the main topics covered during the course, on the bibliography and the methods and results of the exercises and the final project research.

Attendance and behavior

The attendance of class sessions is mandatory. Each assignment deadline is mandatory. The students will be able to reach the final project only if they attend at least the 75% of the class sessions. For each student is mandatory to sign in at the morning arrive in teacher's register of attendance. During class is forbidden to use cell phones, drink and eat, and listen to music, talk loud or act in any way to disturb, etc.. During lecture is forbidden to use also computer etc.

Bibliography

Texts listed below, merely state a framework of minimum basics. Further bibliographic indications will be provided during the course. A university exam requires the ability to perform a literature search. Students will be supported in the construction of a bibliography on specific

topics and on their project. We recommend on-line digital indexes of major libraries: BNCF, Max Planck Institute, BNF, DNB, British Library, NYPL, etc.

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Teacher's page:http://www.unifi.it/p-doc2-2014-0-A-2c303932322b-1.html

B018888 - STATIC AND STABILITY OF MASONRY STRUCTURES
Prof. Giacomo Tempesta

Aims of the course

The course aims to provide the students with the tools necessary to deal, in a critical way, with problems concerning the analysis of the historical masonry buildings, taking into account the problems of stability and safety. After the discussion of the issues relating to the constructive principles, the rules, the techniques and the materials which characterize the historical architectural heritage, during the course some specific aspects are discussed by analyzing the behaviour of the most common historical constructive systems, with particular reference to the matters regarding the equilibriumand limit analysis of structural systems made with overlapping blocks, arches, vaults and domes of masonry.

Expected skills

Acquisition, by the student, of critical skills in the analysis and assessment of the structural safety of historical masonry buildings.

Program of the course

- General knowledge on the concepts of "*material*" and "*structure*".
- Mechanical behaviour of “masonry” as no-tension material: the constitutive model.
- Behaviour and general characteristics of masonry structures
- Elements of graphical statics, funicular polygons, meaning of pressure curve or line of thrust.
- Elements of kinematics of rigid mechanisms.
- The concepts of “apparent structure“ and “actually reagent structure”: the case of the masonry lintel as an emblematic example in the behaviour of a masonry structure.

- Equilibrium and limit analysis of rigid block structures:
  - Equilibrium analysis of a heavy block subjected to horizontal actions.
  - Equilibrium analysis of a structure made with overlapping blocks.
  - Equilibrium analysis of a trilithon
  - Limit analysis and collapse mechanisms in the case of a trilithonwith fractured architrave

- The behavior of masonry wall: overview of the main collapse mechanisms

- Limit analysis of masonry arches subjected to the action of forces and/or yieldings of abutments:

  - Type and geometry of masonry arches.
  - Limit analysis of masonry arch.
  - Kinematical analysis and collapse mechanisms of arches.
  - Limit Analysis of an arch – column system

- Equilibrium analysis of masonry vaults:

  - Type and geometry of masonry vaults: barrel vault, cross vault, rib vault, domical vault, cloister vault.
  - Limit analysis of masonryvaults
  - Collapsemechanisms of masonryvaults

- Masonry domes. Graphical methods and general topics of theory of membrane:

  - Type and geometry of masonry domes: hemispherical dome, pointed dome, polygonal dome.
  - Equilibrium and limit analysis of axial symmetrical domes.
  - Collapse mechanisms of masonry domes

- Case studies: review of experiences of study and research

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