



COURSE DESCRIPTION

Statics and stability of historical buildings

SSD: SCIENZA DELLE COSTRUZIONI (ICAR/08)

DEGREE PROGRAMME: ARCHITECTURE AND HERITAGE (P53)
ACADEMIC YEAR 2022/2023

COURSE DESCRIPTION

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: U3991 - DESIGN STUDIO FOR ARCHITECTURAL HERITAGE
MODULE: U3994 - Statics and stability of historical buildings
CHANNEL: A-Z
YEAR OF THE DEGREE PROGRAMME: I
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I
CFU: 4

REQUIRED PRELIMINARY COURSES

None.

PREREQUISITES

None.

LEARNING GOALS

The course aims to provide students with the fundamental principles which, when correctly acquired and applied, allow to analyze the static behavior of historical buildings, through:

- Learning of the essential knowledge for design and verification of historical structures.
- Learning of the mechanics of materials and structures necessary for the understanding and analysis of complex structural behaviors.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The discipline has its objective in the knowledge of the mechanics of solids and structures and the understanding of the structural behavior of the most common historical structures.

Applying knowledge and understanding

The student develops the ability to transfer the theoretical and methodological knowledge related to the structural aspects into the architectural project and design drawings.

COURSE CONTENT/SYLLABUS

The contents of the course are as follows:

- Fundamentals of Statics and Kinematics 0.5 CFU
- Graphical Statics 0.5CFU
- Mechanical behavior of masonry 0.5CFU
- Local and global collapse mechanisms 0.5CFU
- Behavior of the arc 0.5CFU
- Methods of solution of truss structures 0.5 CFU
- Analysis of timber floors and roofs 0.5 CFU
- Structural analysis of the case study 0.5 CFU

READINGS/BIBLIOGRAPHY

- Course Notes.
- Cremona L. (2009). Graphical Statics.
- De Stefano J. et al., (2020). Design Guide for Timber Roof Trusses. 2020 Timber Frame Engineering Council.
- Heyman J. (1996). Elements of the Theory of Structures. Cambridge University Press.
- Stanley Rabun J. (2000). Structural Analysis of Historic Buildings: Restoration, Preservation, and Adaptive Reuse Applications for Architects and Engineers. John Wiley & Sons.

TEACHING METHODS OF THE COURSE (OR MODULE)

The course is based into lectures, with exercises aimed at verifying the design of theoretical approaches.

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

The final grade, based on the results and skills demonstrated in the discussion of the project as well as the themes and elaborations of the different modules, will be weighted on the credits of each course and therefore composed as follows: Architectural design for heritage 25%; Architectural conservation and construction aspects of historical buildings 17%; Statics and stability of historical buildings 17%; Technological design for architecture 17%; Energy optimization for built heritage use 25%.