



## COURSE DESCRIPTION TECHNIQUE OF CONSTRUCTIONS (UNIT)

**SSD: TECNICA DELLE COSTRUZIONI (ICAR/09)**

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

### COURSE DESCRIPTION

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### GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: 07142 - LABORATORIO DI SINTESI FINALE  
MODULE: 27221 - TECNICA DELLE COSTRUZIONI  
CHANNEL: 04 Cognome A - Z  
YEAR OF THE DEGREE PROGRAMME: V  
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I  
CFU: 2

#### REQUIRED PRELIMINARY COURSES

Laboratorio di Composizione Architettonica e Urbana 4, Progettazione dei sistemi costruttivi, Laboratorio di Urbanistica, Scienza delle costruzioni, Fisica Tecnica Ambientale.

#### PREREQUISITES

Competences acquired in the Theory of Structure (Scienza delle Costruzioni) and Structural Design Lab. (Laboratorio di Tecnica delle Costruzioni) Courses. An attendance rate of 75% at the Structural Design Lab. Course is required for the final exam.

#### LEARNING GOALS

The "Laboratorio di Sintesi finale" course (herein Final Synthesis Workshop) consists of the following courses: Architectural and Urban Design, Urban Planning, Structural design, Environmental Control Technique, Executive Design, Economics and Environmental Assessment. The multiplicity of the aspects involved allows students to develop a proposal for the transformation of the existing context, deepening the various levels of complexity of the project.

The Final Synthesis Workshop aims to: - increase the students' design skills through work based on a critical-interpretative approach to places and a methodological-experimental approach to design strategies; - provide methods and tools to tackle the architectural project by controlling the process of definition and development from the urban to the detailed scale.

The main goal of the **Structural Design module** (Tecnica delle Costruzioni in Italian) is to properly conceive the structures of the buildings under development in the overall project. To this end, the students shall identify the optimal structural solutions in terms of materials, structural typology, floor systems and vertical structures. A special focus will be devoted to the design criteria in seismic zones, according to the current codes, and to the principles of sustainability applied to structural design. By the end of the course, students are expected to better understand the relationships between the architectural design and structural design and properly defend the adopted design solutions at the final examination.

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

#### **Knowledge and understanding**

The students need to show ability to know and understand problems related to the selection of the most suitable structural systems for each architecture. They need to elaborate arguments related to relationships between structure and architecture and recognize the implications of a design choice on the structural safety and serviceability. Students shall be able to independently consult the structural codes and identify the basic requirements of the structural design process

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

The course delivers ability and tools needed to analyze the peculiarities of different structural systems and select the most appropriate one for the ongoing architectural project. Students shall be able to prepare technical drawings and reports to completely describe the structural system (plan, sections, schemes, construction details etc.)

### **COURSE CONTENT/SYLLABUS**

- The structural design process: from the conceptual design to the pre-dimensioning stage;
- Sustainability principles applied to structures: life cycle structural design;
- Structural codes;
- Seismic design basic criteria;
- Ordinary and long-span;
- Thumb rules in structural engineering;
- Structural drawing and reporting.

### **READINGS/BIBLIOGRAPHY**

- 1) Schodek, Daniel L., Dario Coronelli, and Luca Martinelli. *Strutture*. 4th ed. Bologna: Patron, 2004. (in Italian, English version: Schodek, Daniel L.; Bechtold, Martin. *Structures*. Pearson (2013))
- 2) *Norme Tecniche per le Costruzioni*, DM 17 gennaio 2018 (in Italian)

## TEACHING METHODS OF THE COURSE (OR MODULE)

The course is held over one semester. Teaching methods involve frontal lectures, to deliver the content of the Syllabus, and group class activities, aimed at preparing the final project work. During the first part of the course, the students will analyse the structural codes, with the aim to identify the basic structural safety requirements of interest and will cooperatively work to identify the general criteria of their structural project. In this context, students will be asked to carry out a bibliographic research to select a few number of case studies with similar features of the building being designed. A critical analysis of the structural system of the case studies is expected. Collective discussion concerning the case studies will be carried out during the lessons and a final presentation, given by each group, will be planned during the course. In the second part of the course, students will identify the structural system to be used in their group project and will develop all the drawings required to properly describe the design choices. Students will also prepare a shot report, summarising the main findings of bibliographic research carried out in the first part of the course, explaining the structural safety requirements identified for the development of the project, the choices made to identify the proposed structural system and a technical description of the structures conceived.

## 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 mark will be weighted on CFU of each module. The structural design module accounts for 2 CFU.*