COURSE DESCRIPTION
LABORATORY OF CONSTRUCTION TECHNIQUE

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: NOT APPLICABLE
MODULE: NOT APPLICABLE
CHANNEL:
YEAR OF THE DEGREE PROGRAMME: IV
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I
CFU: 12

REQUIRED PRELIMINARY COURSES

Scienza delle Costruzioni

PREREQUISITES

Statica and Scienza delle Costruzioni

LEARNING GOALS

The purpose of the course is to provide the foundations of an analysis methodology aimed at understanding the problems related to the structural design. The goal is to provide the ability for proceeding with the conception, sizing and verification of very simple structural types made in different building materials, so that the future architectural designer, although not able to replace the structural engineer, can competently proceed to the preliminary dimensional setting of simple architectural works.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

During the five years, through lectures, seminars and laboratory activities, the student knows the issues related to the conception and general calculation of the structures as integrated elements of the elaboration of the architectural project in the various fields of its application and understands the interconnections with the other disciplines that contribute to the formation of the architectural project.

Applying knowledge and understanding

The student develops the ability to apply the theoretical and methodological knowledge related to the structural aspects of the architectural project and to produce general and simple design drawings by comparing themselves with the different degrees of depth of the architectural project, at the different scales and in the different areas of its application.

COURSE CONTENT/SYLLABUS

Theoretical Lectures:

The principles of structural safety will be analyzed, focusing on the semi-probabilistic approach to limit states at the base of the design according to current codes. The physical-mechanical characteristics of the materials composing Reinforced Concrete will be described (mechanical properties, constitutive relationships for steel and concrete, bond, shrinkage and viscosity). The design and verification of reinforced concrete sections at the serviceability limit states and at the ultimate limit state loaded by normal stress, bending moment, and combined and shear will be studied, in order to introduce the verification and design of the main structural elements (beams, columns, slabs, frames). Continuous beams and frames with different methods (force method, displacement method, Cross method, Grinter method) will be studied. The principles and criteria for the design of direct and indirect foundations will be provided. The general principles of steel structures will be analyzed, too: the material, the fundamentals of the project, structural systems, welded unions, bolted unions. The course will analyze the general principles of masonry structures and the related construction materials. The basis for safety checks for ordinary masonry buildings will be provided. Behaviors out-of-plane and in-plane for the walls will be analyzed. The basis for the calculation of structures built in seismic risk areas will be provided.

Practical Lectures:

Exercise 1: Design of a reinforced concrete slab

Exercise 2: Design of a reinforced concrete frame

READINGS/BIBLIOGRAPHY

- *E. Cosenza, G. Manfredi e M. Pecce, “Strutture in cemento armato - Basi della progettazione”, Hoepli.*
- *“Norme Tecniche per le Costruzioni” (D.M. 17/01/2018).*
- *Istruzioni per l’applicazione dell’Aggiornamento delle “Norme Tecniche per le Costruzioni” di cui al D.M. 17/01/2018 - Circolare n°. 7 del 21/01/2019.*
- *G. Ballio, F.M. Mazzolani, C. Bernuzzi e R. Landolfo, “Strutture di acciaio” - Teoria e progetto”, Hoepli.*

- *CNR 10011-85 Costruzioni in acciaio.*
- *L. Boscotrecase, F. Piccarreta, "Edifici in muratura in zona sismica - Nuove costruzioni - consolidamento dell'esistente - La teoria e la tecnica", Dario Flaccovio Editore.*

TEACHING METHODS OF THE COURSE (OR MODULE)

Lessons and exercises

EXAMINATION/EVALUATION CRITERIA

a) Exam type

- [x] Written
- [x] Oral
- [x] Project discussion
- [ ] Other

In case of a written exam, questions refer to

- [ ] Multiple choice answers
- [ ] Open answers
- [x] Numerical exercises

b) Evaluation pattern

Overall evaluation.