COURSE DESCRIPTION
FUNDAMENTALS OF SCIENCE OF CONSTRUCTIONS

SSD: SCIENZA DELLE COSTRUZIONI (ICAR/08)

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

COURSE DESCRIPTION

TEACHER: CORBI ILEANA
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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: NOT APPLICABLE
MODULE: NOT APPLICABLE
CHANNEL: 01 Cognome A - Z
YEAR OF THE DEGREE PROGRAMME: II
PERIOD IN WHICH THE COURSE IS DELIVERED: SEMESTER I
CFU: 8

REQUIRED PRELIMINARY COURSES

Mathematical Analysis I / Geometry.

PREREQUISITES

Knowledge of algebraic operations and the basics of plane analytic geometry acquired in Mathematical Analysis and Geometry.

LEARNING GOALS

The course of Fundamentals of Science of Constructions is an annual course of the second year, characterizing in the context of Structural Analysis and Design for Architecture, and has the aim of introducing the methodologies and tools of structural calculation that the student will be able to apply in different disciplines of his studies. The course aims to provide the student, through lectures and classroom exercises, with basic elements of Mechanics useful in the field of Construction Science and Technique and, in general, in the student's training in Architecture.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The course aims to provide the student with the basic knowledge and methodological tools of Mechanics, therefore the primary requirement for this learning are the notions and analytical skills acquired in the course of Mathematical Analysis and Geometry. At the end of the course, the student must demonstrate knowledge and understanding of the structural problems dealt with and correctly handle the theoretical foundations and application methodologies.

Applying knowledge and understanding

The student must demonstrate to be able to solve structural analysis problems concerning the course contents, and to apply the methodological tools learned by highlighting his own approach and the ability to concretely use the acquired knowledge to solve simple structural schemes.

COURSE CONTENT/SYLLABUS

Elements of Vector Theory and Linear Algebra. Fundamentals of Mechanic. Lagrangian coordinates. Stresses and distortions. Displacement field. Rigid motions. Constraint conditions. Articulated motions. Compatibility equations. Equilibrium equations of a system of free and / or constrained bodies. Stress characteristics. Bending moment, normal stress and shear. Relations between load, shear, and moment. Articulated systems. Lability, hyperstaticity, isostaticity. The funicular polygon. Graphical determination of reactions. Internal stress characteristics diagrams. Kinematic chains and their use. Principle of Virtual Works for articulated systems. Equilibrium equations. Graphic methods of solution. Basics of area geometry. Elements of Deformation Analysis and Stress Analysis. Principle of Virtual Works for deformable bodies and its application to structures. The stress-strain relationship for uniaxial stress states. Beam Technical Theory. Equation of the elastic line. Elastic structures composed of beams. Corollaries of Mohr. Methods for the analysis of hyperstatic structures: the force method and the principle of virtual works.

READINGS/BIBLIOGRAPHY

- Corbi, Liccardo. Applicazioni Introduttive alla Teoria delle Strutture. Liguori Ed. Vol. I e II
- Corbi, Liccardo. Le strutture articolate. Liguori Ed. Vol. I e II
- Franciosi. Fondamenti di Scienza delle Costruzioni. Liguori Ed.
- Viola. Esercitazioni di Scienza delle Costruzioni. Pitagora Ed.
- Notes and slides of the course on the teacher website unina: http://www.docenti.unina.it/Ileana.Corbi

TEACHING METHODS OF THE COURSE (OR MODULE)

The teacher will use: a) frontal lessons for about 50% of the total hours, b) exercises to deepen the theoretical aspects and address the various structural problems dealt with for the remaining 50%. Multimedia supports will be used, presentation of lessons in .ppt format, carrying out exercises on the blackboard, online presentations, stimulating interaction with students.

EXAMINATION/EVALUATION CRITERIA

a) Exam type

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

In case of a written exam, questions refer to

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

b) Evaluation pattern

In order to pass the exam, the mastery of the theoretical and applicative tools and of the analysis methodologies for the solution of structural problems applied to rigid bodies and elastic beams, carried out during the course, will be assessed.