



REINFORCED CONCRETE STRUCTURES

Enrollment year	2017/2018
Academic year	2021/2022
Regulations	DM270
Academic discipline	ICAR/09 (CONSTRUCTION TECHNIQUES)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	
Curriculum	PERCORSO COMUNE
Year of study	5°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	6
Lesson hours	45 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	PAVESE ALBERTO (titolare) - 6 ECTS
Prerequisites	Knowledge of basic elements of theory and design of the constructions courses is required.
Learning outcomes	<p>The course intends to deepen some topics already introduced in the previous structural design design course, and to address others of main relevance for understanding the mechanical response of reinforced concrete structures. The main objectives are:</p> <ul style="list-style-type: none">• understand the mechanical behavior of reinforced concrete structures and their components at the SLS and ULS;• Acquire the ability to design the main structural elements subjected to normal, shear and torsion actions, single or combined each other;• Understand the link between the design procedures inspired by the concepts learned in previous courses and the codes and practical limits (National and European codes of practice)
Course contents	<ul style="list-style-type: none">• Use of reinforced concrete in civil, industrial and infrastructural

	<p>structures;</p> <ul style="list-style-type: none"> • Main construction techniques based on the use of reinforced concrete; • Structural layout of the main construction types (buildings and bridges) and description of the structural elements used; • Mechanical properties of materials and experimental tests: normal and high-strength concretes, steel; • Ductility of sections and structural elements, moment-curvature diagram; main aspects in the ductility of the sections (role of reinforcements and axial load); • Methods of analysis: linear elastic with and without moment redistribution, analysis with Strut & Tie models (limit analysis); • Design and verification of elements subjected to normal, shear and torsion actions. Serviceability limit states (cracking, deformation, etc.) and ultimate limit states (collapse with and without equilibrium instability); • Arrangement of longitudinal and transverse reinforcements within structural elements; • Two-dimensional structures: dimensioning of reinforced concrete plates, punching of floors;
Teaching methods	<p>Lectures focused on the description of structural typologies, materials used and characterization tests;</p> <p>Lectures on the analysis and design of one- and two-dimensional elements subjected to normal, shear and torsional actions</p> <p>Exercises related to the aspects of calculation and design of one-dimensional elements</p> <p>Laboratory lessons aimed at a better learning of the behavior of materials;</p>
Recommended or required readings	<p>Notes, scientific papers and other didactic material will be distributed during classes</p> <p>Bibliography</p> <p>Cosenza E., Manfredi G., Pecce M.. Strutture in cemento armato – Basi della progettazione . Ed. Hoepli, 2008.</p> <p>Aicap. Guida all'uso dell'Eurocodice 2 con riferimento alle Norme Tecniche D.M. 14.01.2008 . Ed. Pubblicamento, 2008.</p> <p>Eurocodice 2 - Progettazione delle strutture in calcestruzzo. UNI - Ente nazionale di unificazione.</p>
Assessment methods	<p>Written exam related to the design of a simple reinforced concrete structure</p> <p>Oral exam focused on the verification of the learning of theoretical and practical aspects</p> <p>Access to oral exam is subjected to passing the written exam</p>
Further information	
Sustainable development goals - Agenda 2030	<p>\$lbl_legenda_sviluppo_sostenibile</p>