UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2023/2024
MASTER'S DEGREE (MSC)	CIVIL ENGINEERING
SUBJECT	DESIGN OF STEEL AND CONCRETE STRUCTURES
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50353-Ingegneria civile
CODE	21620
SCIENTIFIC SECTOR(S)	ICAR/09
HEAD PROFESSOR(S)	CAMPIONE GIUSEPPE Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	142
COURSE ACTIVITY (Hrs)	83
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	DESIGN OF STEEL AND CONCRETE STRUCTURES - Corso: BUILDING ENGINEERING DESIGN OF STEEL AND CONCRETE STRUCTURES - Corso: INGEGNERIA DEI SISTEMI EDILIZI
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**CAMPIONE GIUSEPPE** Monday 9:00 11:00 Stanza docente, presso Dipartimento Ingegneria- Area strutture, secondo piano

DOCENTE: Prof. GIUSEPPE CAMPIONE

PREREQUISITES	Knowledge of static reinforced concrete; Knowledge of limit state theory; Knowledge of the theory of single-dimensional elements; Knowledge of semi-probabilistic method to limit states. Knowledge of static reinforced concrete and the theory of limit states, Knowledge of the theory of single-dimensional elements.
LEARNING OUTCOMES	Knowledge and understanding: Knowledge of the path required for the design of reinforced concrete and steel structures and structures and the identification of load-bearing capacity and resilient and ductile resources. Identification of the main criticalities in the design of reinforced concrete structures and steel. Ability to apply knowledge and understanding: Identification of structural elements and identification of the main structural design techniques in reinforced concrete and steel. Application of technical regulations in the design of structural elements and ability to apply security checks and strategies for proper design. Autonomy of judgment: Evaluation of the need to implement suitable design choices based on customer requirements and in accordance with current regulations, without losing the principles of cost-effectiveness of design solutions. Communicative Skills: Ability to describe to a hypothetical buyer the choices considered more appropriate from a design / structural or economic point of view. Ability to discuss with the competent bodies in structural design. Learning Capacity: Ability to interpret and apply the instructions for the structural design of reinforced concrete and steel artifacts. Possibility to apply classical structural analysis methods in elastic and plastic fields aimed at the structural verification of the limit states.
ASSESSMENT METHODS	The exam consists of an oral exam with an assigned tutorial. At the end of the first module there is also a on-going written test concerning the design and verification of structural elements such as diffusing areas / tough shelves and the design of the plinth standing states on piles. The on-going test does not contribute to the final evaluation. For the oral examination, knowledge of the basic principles for the design of reinforced concrete structures (ductility, limit states, design in case of earthquake) is required; Basic principles, methods of designing and testing of solid, plinth, plinth, plinths on poles, retaining walls slabs and plates, antiseismic walls; Knowledge of the basic principles for the design of steel structures; Knowledge of basic principles and design of bolted elements; Knowledge of basic principles and design of welded elements. The test is passed if the student responds sufficiently to at least two questions Sufficient will be achieved when the student has shown good exposure skills and minimal autonomy in developing and applying the techniques and knowledge acquired using a technically correct language on the content of the lesson. The evaluation is expressed in thirty with possible praise, according to the diagram in the bulletin board at the bottom of the site of the study site under "Assessment Methods".
EDUCATIONAL OBJECTIVES	Knowledge of the design process leading to the definition of reinforced concrete structures, prestressed concrete, steel, with mixed steel-concrete-steel and glass, with reference to approximate and exact methods and taking into account the regulatory and architectural constraints.
TEACHING METHODS	Course in English language with frontal lessons, classroom and individual exercises, laboratory exercises at laboratory for testing materials and structures.
SUGGESTED BIBLIOGRAPHY	Pozzati P. e Ceccoli C. “Teoria e tecnica delle strutture, Utet vol.II 1977 Belluzzi O. Scienze delle costruzioni Vol II e III Zanichelli Leonhardt F. c.a. e c.a.p : calcolo di progetto e tecniche costruttive. Edizioni Tecniche Milano VOl. I-III 1977. Migliacci A. Progetti di Strutture. Tamburini , Milano 1968. Migliacci A. Progetto agli stati limite delle strutture. Masson Italia Ed. 1977. G. Ballio e F. M. Mazzolani: “Strutture in acciaio”, Mondadori Editore, Milano 1975 N. Scibilia: “Progetto di strutture in acciaio”, Flaccovio Editore, Palermo VI Ed. 2010. S. Arangio, F. Bucchi, F. Bontempi “Progettazione di strutture in acciaio” Flaccovio Editore, Palermo 2010. Dispense ad uso interno. Può essere utilizzata qualsiasi edizione dei libri di testo

SYLLABUS

Hrs	Frontal teaching
3	Static Analysis of the ordinary reinforced concrete constitutive laws of ordinary concrete and high performance with problems relating to confinement and the viscous effects; stability testing of slender columns c.a .; Cuttingtime interaction; diffusive regions and calculation methodologies.
5	Direct and indirect foundations (smooth and ribbed audience, footings, beams, screens on poles and not); retaining walls, culverts, ponds and pools.
5	Static of prestressed concrete with short and long term effects. Use of prestressed concrete in civil construction and infrastructure.
3	Approximate analysis for the determination of the stresses of flat and curved plates and the plates.
3	Recurrent problems in the design of buildings in c.a .: parerti filled and drilled subject to vertical and horizontal forces loads; design of beams and slabs (ordinary beams, flat, hanging, holes in the beams and floors).
4	The development of metal structures until the mid-twentieth century - The teaching of metal designs. Low carbon steel alloy and alloy steels - Stainless steels - Light alloys. Laboratory tests on test - Tensile Testing - Hardness tests - tests of resilience Criteria of resistance - the maximum shear stress criterion (Tresca) - the maximum distortion work criterion (Huber-Mises-Hencky)
4	Strained rods - Check the status of the limit in bending rods - The ductility of the beams inflected bending, shear and torsion in steel profiles
4	Unions, riveted or bolted - Tests on bolts Unions to friction with high strength bolts welded joints - Alterations induced by welding - Controls
4	Stability 'balance - the problem formulation stability anayssy of slender members

Hrs	Practice
4	specific types for earthquake-resistant buildings space frames to rigid nodes Structures with vertical bracing Frames with eccentric diagonals composite beams - Compound Columns
5	Provide for the exercises for each topic held on the elections of numerical applications to play with both the teacher and autonomously.
5	steel joints calcualtion
5	design of D regions
6	Draft plan mono industrial buildings - the main transverse frame beams ---- Types of beams - Types of columns - Types of scales -
6	Analysis of concrete structures
6	Examples of decks in steel multi-storey buildings, Purlins, roof coverings, beams and columns
5	Analysis of walls and pools
6	Analysis of concrete structures