



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2021/2022
BACHELOR'S DEGREE (BSC)	CIVIL ENGINEERING
SUBJECT	MECHANICS OF MATERIALS AND THEORY OF STRUCTURES
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50277-Ingegneria civile
CODE	06313
SCIENTIFIC SECTOR(S)	ICAR/08
HEAD PROFESSOR(S)	PALIZZOLO LUIGI      Professore Associato      Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	142
COURSE ACTIVITY (Hrs)	83
PROPAEDEUTICAL SUBJECTS	03675 - GEOMETRY 04954 - RATIONAL MECHANICS
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	PALIZZOLO LUIGI Thursday 10:00 12:00

**DOCENTE:** Prof. LUIGI PALIZZOLO

<b>PREREQUISITES</b>	Knowledge of the following concepts and/or subjects: displacement, velocity, acceleration and related mathematical and phisic relations; derivatives and integrals of functions; kinematic of rigid systems; statical and dynamical equilibrium; virtual work principle.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding skills: aim of the course is the knowledge of the solid and structure mechanics and the comprehension of the structural conception of the more utilized structures for architectural constructions.</p> <p>Ability to apply knowledge and understanding: the knowledge of the structural mechanics and the comprehension of the structural conception must produce the ability for dimensioning and verifying structural systems. It represents a fundamental cultural and professional baggage in order to knowingly perform design and/or restoration of architectural artifacts.</p> <p>Autonomy of judgment: students must be able to associate a suitable structural model at each analyzed architectural artifact.</p> <p>Communicative skills: students must be able to expose the results of their work with logical rigor and language properties.</p> <p>Learning ability: students must be able to indipendently improve their knowledge.</p>
<b>ASSESSMENT METHODS</b>	Written test and oral discussion.
<b>EDUCATIONAL OBJECTIVES</b>	Understanding of the structural behaviour of the most usual structures for civil and industrial buildings.
<b>TEACHING METHODS</b>	Lecture hours, exercise sessions, visit to the laboratory of structural engineering
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>1 )Benvenuto E., La Scienza delle Costruzioni e il suo sviluppo storico, Sansoni, Firenze, 1981.</p> <p>2 )Giambanco F., Lezioni di Statica, D. Flaccovio, Palermo, 1999. ISBN 8877582294.</p> <p>3 )Polizzotto C., Scienza delle Costruzioni, Centro Stampa Siciliana, Palermo, 1980.</p> <p>4 )Corradi Dell'Acqua L., Meccanica delle Strutture, Vol. I,II,III, McGraw-Hill, Milano, 2010.</p> <p>5 )Viola E., Lezioni di Scienza delle Costruzioni, Pitagora, Bologna, 2003. ISBN 8837113412.</p> <p>6 )Viola E., Esercitazioni di Scienza delle Costruzioni, Vol. I,II,III, Pitagora, Bologna, 1985. ISBN 8837103565.</p> <p>7 )Casini P., Vasta M., Scienza delle Costruzioni, Citta' Studi edizioni, 2016. ISBN 8825174055.</p> <p>8 )Dispense del corso.</p>

## SYLLABUS

Hrs	Frontal teaching
1	Themes and purposes of mechanics of materials and structures
2	Static and kinematic of rigid bodies
2	Beam system: static classification, generalized stresses, Principle of Virtual Work
2	Geometry of areas.
4	Determination of the generalized stress function for statically determined structures
3	Elastic problem solution for statically undetermined structures
5	Stress analysis for continuous Cauchy bodies
1	Strain analysis for continuous Cauchy bodies
3	Constitutive equations: Hooke law. Linear elastic problem for continuoous bodies
3	Safety criteria: Galileo, Tresca, Von Mises
1	The De Saint Venant problem for beams
4	Analysis of beams subjected to axial force and bending moment
2	Analysis of beams subjected to shear force: Jourawski theory
2	Analysis of beams subjected to torsion
Hrs	Practice
5	Exercises related to rigid bodies
6	Exercises related to beam systems
2	Exercises related to the geometry of areas
6	Applications to the analysis of statically determined structures
3	Exercises related to the beam technical theory
8	Applications to the analysis of statically undetermined structures
2	Exercises related to the stress analysis of continuous bodies
5	Applications to structures constituted by beams subjected to axial force: the case of trusses
2	Applications for beams subjected to bending moments

Hrs	Practice
3	Applications to beams subjected to axial force and bending moments
4	Applications to beams subjected to shear force
2	Applications to beams subjected to torsion