



STRUCTURAL MECHANICS	
Enrollment year	2014/2015
Academic year	2015/2016
Regulations	DM270
Academic discipline	ICAR/08 (CONSTRUCTION SCIENCE)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL AND ENVIRONMENTAL ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	1st semester (28/09/2015 - 15/01/2016)
ECTS	6
Lesson hours	45 lesson hours
Language	ITALIAN
Activity type	WRITTEN AND ORAL TEST
Teacher	MORGANTI SIMONE - 2 ECTS REALI ALESSANDRO - 4 ECTS
Prerequisites	The course requires the knowledge of the topics of Analisi Matematica A (Calculus A), Fisica Matematica (Rational Mechanics) and Geometria and Algebra (Linear Algebra). Moreover, basic notions from the course of Fondamenti di Informatica (Basics of Informatics) are useful.
Learning outcomes	The goal of this module of the course is to provide the students with the basic and general ideas to tackle complex structural systems. The two fundamental steps are a first phase of construction of the system model (with a particular focus on beam models) and a second more practical phase aiming at the determination of the static equilibrium, as well as of the stress and strain state.
Course contents	1. Rigid body systems Introduction, definitions and static equilibrium equations. Constraints. Kinematic analysis. Static analysis. Geometric and static determination.

	Static indetermination and mechanisms. Analytical and graphical solution methods. Computation of reaction forces. Modeling of complex structural systems and their reduction to simple statically determined schemes. 2. Stress state analysis Truss systems. Beams. Generalized stress diagrams for beams and frames. 3. Statically indeterminate systems Bernoulli-Euler deformable beams. Methods for the determination of the stress and deformation states. Continuous beams. Use of Mohr's analogy for the deformation and reaction force determination. 4. Multiply statically indeterminate systems Displacement approach. Matrix form of the problem. 5. Potential further topics Timoshenko deformable beams.
Teaching methods	Lectures (hours/year in lecture theatre): 90 Practical class (hours/year in lecture theatre): 0 Practicals / Workshops (hours/year in lecture theatre): 0
Reccomended or required readings	Lecture notes Cinquini C. . Lezioni di Scienza delle Costruzioni. Schonenfeld & Ziegler, Milano. Bucci G., Cinquini C.. Elementi di Teoria della Trave e Soluzioni Strutturali. Schonenfeld & Ziegler, Milano. Baldacci R. . Scienza delle Costruzioni, vol. I, II.. UTET, Torino. Capurso M. . . Lezioni di Scienza delle Costruzioni. Pitagora Editrice, Bologna. Corradi Dell'Acqua L. . Meccanica delle Strutture, vol. I, II, III. McGraw-Hill, Milano. Belluzzi O. . Scienza delle Costruzioni, vol. I, II. Zanichelli, Bologna.
Assessment methods	Written examination: theoretical questions and exercises
Further information	Written examination: theoretical questions and exercises
Sustainable development goals - Agenda 2030	\$lbl_legenda_sviluppo_sostenibile