



STRUCTURAL ENGINEERING AND MECHANICS C

Enrollment year	2014/2015
Academic year	2016/2017
Regulations	DM270
Academic discipline	ICAR/08 (CONSTRUCTION SCIENCE)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	CIVIL AND ENVIRONMENTAL ENGINEERING
Curriculum	INGEGNERIA PER L'AMBIENTE E IL TERRITORIO
Year of study	3°
Period	1st semester (26/09/2016 - 13/01/2017)
ECTS	6
Lesson hours	55 lesson hours
Language	ITALIAN
Activity type	WRITTEN AND ORAL TEST
Teacher	VENINI PAOLO (titolare) - 6 ECTS
Prerequisites	Basics of continuum mechanics and beam theory. Matlab programming
Learning outcomes	Knowledge of the finite element method and ability to program simple finite elements in Matlab Capability to analyze simple structures in static and dynamic regime, especially when the analytic exact solution is not available
Course contents	The finite element method 1) Truss element 2) Beam element 3) Extension to the dynamic case. Instability of equilibrium 1) The Euler problem in large and small strains

	<p>2) Static formulation, dynamic formulation, energetic formulation</p> <p>3) Finite element solutions</p> <p>Statics and dynamics of a thin plate</p> <p>Structural dynamics (an introduction)</p> <p>1) Governing equations for continuous and discrete vibrating structures</p> <p>2) Modal analysis</p> <p>3) State-space formulation</p> <p>4) Bode diagrams</p>
Teaching methods	<p>Lectures: 40 hours per year</p> <p>Matlab programming: 20 hours per year</p>
Reccomended or required readings	<p>Handout written by the instructor</p> <p>T.J.R. Hughes, The Finite Element Method: Linear Static and Dynamic Finite Element Analysis, Dover books on Mathematics</p>
Assessment methods	<p>Matlab programming test with analytic check of the numerical results.</p> <p>Oral exam</p> <p>(both are compulsory and must be taken within the same session)</p>
Further information	<p>Matlab programming test with analytic check of the numerical results.</p> <p>Oral exam</p> <p>(both are compulsory and must be taken within the same session)</p>
Sustainable development goals - Agenda 2030	<p>\$Ibl legenda sviluppo sostenibile</p>