



International Doctorate in Civil and Environmental Engineering

DOCTORAL COURSE

Introduction to tensor calculus

Teacher: Dr. **Cristina Padovani**

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Calendar	
21/01/2020, 09,30-11,30, Aula "Piero Villaggio" (IV piano), Sede di Ingegneria Strutturale(edificio A), Dip.to di Ingegneria Civile e Industriale (DICI) Università di Pisa, Largo Lucio Lazzarino, Pisa	
23/01/2020, 14,30-16,30, Aula "Piero Villaggio"	
28/01/2020, 09,30-11,30, Aula "Piero Villaggio"	
30/01/2020, 14,30-16,30,, Aula "Piero Villaggio"	
04/02/2020, 09,30-11,30, Aula "Piero Villaggio"	
06/02/2020, 14,30-16,30,, Aula "Piero Villaggio"	
11/02/2020, 09,30-11,30, Aula "Piero Villaggio"	
13/02/2020, 14,30-16,30,, Aula "Piero Villaggio"	
Total	16 hours – 8 credits

Program
Finite-dimensional vector spaces, scalar products, norms, bases, subspaces, maps, functionals, convergence of vectors, projections, differentiation. Second-order tensors, symmetric and skew-symmetric tensors, orthogonal tensors, eigenvalues, eigenvectors, spectral theorem, square-root theorem, polar decomposition theorem, Cayley-Hamilton theorem, coaxial tensors. Third and fourth-order tensors. Isotropic functions. Derivatives of tensor functions.