



Dipartimento di Strutture per l'Ingegneria e l'Architettura (DiSt)

Nell'ambito del corso di **Dottorato in Ingegneria Strutturale, Geotecnica e Rischio Sismico**

Dott. Ing. Salvatore Sessa

*Dipartimento di Strutture per l'Ingegneria e l'Architettura
Università di Napoli Federico II*

Finite Element Analysis of Plates and Shells (3CFU, 24h)

The course presents an introduction to the analysis of linear and nonlinear membranes, plates and shells by the finite element method. In particular, the course will illustrate the most common theoretical formulations of two-dimensional elements as well as their implementation and use in finite element codes.

Besides the theoretical formulations, the course will focus on the use of a standard finite element framework and will present applications typical of civil engineering problems (masonry and reinforced concrete) as well as aerospace and mechanical engineering (metal alloys and composites).

More in detail, the main topics are:

- Basics of membrane theory: generalized stress and strain, linear and nonlinear constitutive models.
- Kirchhoff and Reissner-Mindlin linear models of plate/shells.
- MITC 3D shell finite element: shape functions, generalized stress and strain, implementation in finite element codes.
- Mesh dependency of the analysis, patch tests, convergence issues. Stability of the computational solutions.
- Characterization of nonlinear, triaxial constitutive models: Von Mises plasticity, Drucker-Prager, modelling of alloys, composites, concrete and masonry.
- Transverse confinement in shell elements: equilibrium and compatibility approaches.

Sept. 15, 16, 17 and 18, 2020

10 am to 1 pm & 3 pm to 6 pm

The course is offered online on MS Teams

Please contact Dr. S. Sessa (salvatore.sessa2@unina.it) to be added to the Class