



UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
DIPARTIMENTO DI STRUTTURE PER L'INGEGNERIA E L'ARCHITETTURA
Dottorato in Ingegneria Strutturale, Geotecnica e Rischio Sismico

PROPOSTA CORSO / SEMINARIO – OFFERTA FORMATIVA 2026

Titolo del corso/seminario	Artificial Intelligence and Machine Learning in FEM Analysis of Materials and Structures
Docente proponente (per i docenti esterni indicare l'affiliazione)	Salvatore Sessa
Argomenti trattati / Descrizione sintetica	The course introduces Artificial Intelligence (AI) and Machine Learning (ML) techniques for Finite Element Method (FEM) analysis of materials and structures. It focuses on integrating data-driven and physics-informed models into numerical simulations using OpenSeesPy, with applications in material modelling, inverse problems, surrogate modelling, optimization, and reliability assessment. Topics: Basics: machine learning, regression, classification and cross-validation. Support Vector Machines and Kernels: theory and applications to failure of structural elements. Neural Networks and physics-informed loss formulations. Optimization algorithms and Surrogate models. Data-Driven constitutive modelling and inverse-FEM. Equilibrium bifurcation paths determination. Uncertainty quantification and reliability assessment. Bayesian Networks and Inverse Identification. Advanced applications: AI-driven models, generative-AI, and Quantum Computational Mechanics.
Data o periodo previsto	Marzo - Maggio 2026
Numero di ore totali	24
CFU proposti	3
Modalità di erogazione	In presenza

Da restituire compilato in ogni sua parte a phd.dist@unina.it entro il 30 novembre 2025.