

Polytechnic University of Turin

Ph.D. Program in Civil and Environmental Engineering

4 - 7 May, 2021

10:00 - 13:00



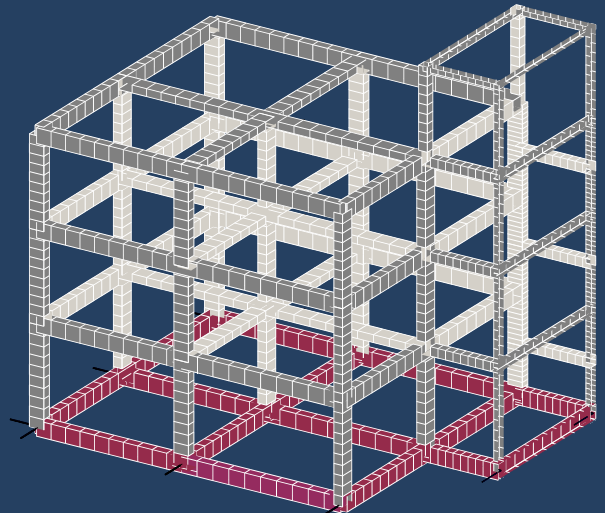
Short Course for Ph.D. students

Advanced Modeling of Hysteresis Phenomena in Mechanical Systems and Materials

Hysteresis is a complex nonlinear phenomenon observed in many areas of science and engineering.

The aim of the 12-hour online short course is to illustrate some conventional and recently developed **mathematical models** and **numerical methods** required to simulate the complex behavior of **hysteretic mechanical systems and materials**.

The short course is organized into 4 theoretical lectures and 4 lab sessions during which several nonlinear time history analyses will be performed on hysteretic mechanical systems by using **Matlab** and **OpenSees**.



Instructor: Nicolò Vaiana | Research Fellow in Structural Mechanics

Short Course Program

Lecture 1 (May 4, 2021 | 10:00 - 13:00)

Hysteretic Mechanical Systems and Materials

Hysteresis Phenomena
Nonlinear Equilibrium Equations

Lecture 2 (May 5, 2021 | 10:00 - 13:00)

Uniaxial and Biaxial Hysteretic Models

Modeling of Rate-Dependent Hysteretic Behavior
Modeling of Rate-Independent Hysteretic Behavior

Lecture 3 (May 6, 2021 | 10:00 - 13:00)

Numerical Time Integration Methods

Conventional Time Integration Methods
Structure-Dependent Time Integration Methods

Lecture 4 (May 7, 2021 | 10:00 - 13:00)

Nonlinear Dynamic Analysis by using Matlab and OpenSees

NDA of 3D Structures Equipped with Energy Dissipation Devices in Matlab
NDAs of 3D Seismically Base-Isolated Structures in OpenSees (R. Capuano)



Registration

Ph.D. students from PoliTo and other Italian or foreign universities, who are interested in attending the online short course, are invited to send an e-mail to: nicolo.vaiana@polito.it.

There are NO registration fees.



Invited lecturer: Raffaele Capuano | M.S. student in Structural Engineering