ECCOMAS:
European Community
on Computational Methods
in Applied Sciences

UNIVERSITÀ
DI PAVIA

ECCOMAS
Advanced Course

NL24 COURSE

NONLINEAR COMPUTATIONAL SOLID & STRUCTURAL MECHANICS

Pavia May 6-10, 2024

Theoretical formulations, technologies, and computations

3D@UniPV
Virtual Modeling and Additive Manufacturing for Advanced Materials

Ordine Ingegneri
provincia di Pavia

REGISTRATION

To register to the course, participants should fill in the online form on the website http://nlcourse.unipv.it/
Registration is completed only after receiving the money transfer receipt

FEES

Participant from industry:	**1300€ (*early*)**	**1500€**
Faculty members:	**850€ (*early*)**	**1000€**
PhD Students & Post-Docs*:	**700€ (*early*)**	**850€**

*Proof of status required.

Early registration is kindly recommended. The payment should be done **before 29.03.2024**. If needed, registration is transferable to another member of the same organization.

Fixed-menu lunches, coffee breaks, and course material are included.

Cancellations: 70% of the registration fee refund for cancellations before **April 1st, 2024**. No refund will be made for cancellations after that date.

PAYMENT METHODS

For further information about payment methods,

check webpage **http://nlcourse.unipv.it/**

or contact **nl2024@unipv.it**

DISCLAIMER

It is possible that changes in program (e.g. switching to some on-lines lectures) or in teaching body may occur. In case of such a change, if the course is going to be maintained and offered, no refunding is planned. Refunding is planned only to course cancellation.

SECRETARIAT

Via Ferrata, 3 - 27100 Pavia, Italy
+39.0382.985463
nl2024@unipv.it
http://nlcourse.unipv.it/

COURSE OBJECTIVES

To provide engineers, graduate students, and researchers with a **review of numerical techniques and solution algorithms for nonlinear mechanics**. The course will introduce the current state-of-the-art in finite element modeling of nonlinear problems in computational mechanics and will highlight the difficulties (and possible solutions) in a number of applications.

Different sources of nonlinear behavior will be examined in a systematic manner, with special attention to nonlinear constitutive behavior of materials, large deformations and rotations of structures, contact and instability problems with either material (localization) or geometric (buckling) nonlinearities, necessary to fully grasp structural design weaknesses.

The course will also provide insight on both advanced mathematical aspects and practical aspects of several computational techniques, such as the finite element method, isogeometric analysis, meshless techniques and virtual element method.

Objective of the course is to provide the participants with a solid basis for computational tools and software use to achieve the optimal design, and/or to carry out a refined analysis of nonlinear behavior structures.

The course finally will provide a basis to account for multi-physics and multi-scale effects, likely to achieve a significant break-through in many industrial applications.

Course schedule and lecture contents can be checked on the webpage: http://nlcourse.unipv.it/

TUTORIALS

Every day will end with an interactive session where sample problems are addressed, solved on the spot, and used as a basis for discussion. Students are strongly encouraged to bring their own laptops to run examples and participate actively to the tutorials. Depending on the topic, tutorials will be based on use of different software including FEAPpv (http://projects.ce.berkeley.edu/feap/feappv/) and in-house codes written in Matlab or Maple.

To further guide areas of discussion in the tutorials, applicants are encouraged to describe their specific interests as part of their registration.

COURSE MATERIALS

Electronic copies of lecture materials and survey papers, copies of Finite Element Analysis Program (FEAPpv), and the complete volume of notes will be available to all participants.

LECTURERS

Ferdinando Auricchio. Professor of Mechanics of Solids at University of Pavia, Italy. *Expertise*: constitutive modeling of innovative materials, biomechanics, FEM. *Projects*: "3D@UniPV: Virtual Modeling and Additive Manufacturing (3D printing) for Advanced Materials".

Manfred Bischoff. Head and Professor of Institute of Structural Mechanics at University of Stuttgart, Germany. *Expertise*: nonlinear computational structural mechanics and dynamics, modeling and analysis of shells, FE technology, structural optimization, contact problems, isogeometric analysis, adaptive structures.

Carlo Lovadina. Professor of Numerical Analysis at University of Milan, he mainly works on Galerkin methods for problems arising from Continuum Mechanics. He has contributed to design and theoretical analysis of FE and isogeometric methods for elasticity, including thin structures. Recently, his studies are focused on virtual element method applied to engineering problems.

Alessandro Reali. Professor of Mechanics of Solids and Head of the Department of Civil Engineering and Architecture at University of Pavia, Italy. *Expertise*: isogeometric analysis, advanced constitutive modeling, mixed FE, and strong-form methods.

Giancarlo Sangalli. Professor of Numerical Analysis at Mathematics Department of University of Pavia, Italy. *Expertise*: multiscale numerical methods, domain decomposition methods, isogeometric methods, with application in solid, fluid mechanics, and electromagnetism.

Robert L. Taylor. Professor of the Graduate School, Department of Civil and Environmental Engineering, University of California, Berkeley, USA. *Expertise*: computational mechanics, element technology, contact problems, solution algorithms and software development.

COURSE LOCATION

The beautiful and historical **Palazzo Vistarino**, **via sant'Ennodio 26, Pavia**, Italy.
(**web-site**: https://www.palazzovistarino.it/eng/)

ACCOMODATION

Participants can book a guest room (with limited availability) at **Palazzo Vistarino**, **by sending an email to the Secretariat. Other accommodations** are available for **direct booking by participants.**

ORGANIZING COMMITTEE

Prof. Ferdinando Auricchio auricchio@unipv.it
Prof. Simone Morganti simone.morganti@unipv.it