VENUE INFORMATION

This is a course offered to Graduate students interested in current research in solid and fluid mechanics. The course runs June 22-24, 2025, just before the conference ECCOMAS MSF 2025, which is held June 25-27, 2025 (for more details, please visit conference webpage: ***https://ceacm.net/msf-2025/***).

Despite a reduced fee, the course students will also be admitted to the conference scientific program.

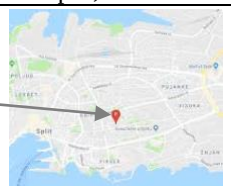
The Conference venue is ***Split,*** the capital of Dalmacija, the largest region on Adriatic coast of Croatia. Early day history of Split revolves around a Greek settlement founded in the area between the 3rd and 4th centuries. The most famous historic development came in 295 AD, when Roman emperor Diocletian ordered an imperial palace to be built there, for his retirement. History says that Diocletian was local son from present-day Solin (known as Salona in Roman times), about 5km from Split, who first became Roman army general and then emperor, and finally the first emperor to take retirement. Diocletian palace, which took ten years to build, is at present one of the most magnificent monuments in Split. It was used after Diocletian's death by many other Roman rulers, until 7th century when the Roman settlement of Salona (Solin) was abandoned, which allowed many of its inhabitants to seek sanctuary behind the palace's high walls and some of their descendants still live within the palace walls. The rest of city history is quite turbulent, alternating the periods of autonomy (until 14th century) and of domination by Venetian until late 18th century and Habsburg's empire until early 20th century, all contributing to rich cultural and monumental heritage of Split.

The course is organized under sponsorship of Central European Association for Computational Mechanics (CEACM) and ACMBH.

Conference venue/ contact address (see plan below):

Fakultet građevinarstva, arhitekture i geodezije

Address: Matice hrvatske 15, 21000 Split, Croatia



COURSE OBJECTIVES

The main objective of this course is to provide graduate students and researchers, with an extensive review of numerical models for computational solid and fluid mechanics, and pertinent modern developments in model reduction, probability aspects and uncertainty quantification. It presents the current state-of-the-art in finite element, finite volume and discrete element modeling of nonlinear problems in solid and fluid mechanics, and their coupling with thermal fields and interaction. It will illustrate the difficulties (and their solutions), which appear in a number of applications from mechanical, aerospace and civil engineering or material science. All the sources of nonlinear behavior are presented in a systematic manner, related to kinematics, equilibrium, constitutive equations, or boundary and coupling conditions. Special attention is paid to dealing with a class of problems with nonlinear constitutive behavior of materials, large deformations, and rotations in solid and fluid mechanics.

In addition, a detailed presentation of modern probability aspects is given, which is of great interest for current research for quantifying the epistemic uncertainties pertinent to the material heterogeneities, and aleatoric uncertainties pertinent to evolution problems.

Our second objective is to provide the participants with a solid basis for using the FEM, FVM or particle-based models and software in trying to achieve the optimal design, and/or to carry out a refined analysis of nonlinear behavior of structures or multibody systems in real-life simulations. The course finally provides a basis to account for any pertinent multi-physics and multi-scale effects, which are most likely to provide significant innovations and break-through in a number of industrial applications.

Course Material: copy of scientific papers and lecture notes

Course Textbooks:

-Nonlinear Solid Mechanics: Theoretical Formulations and Finite Element Solution Methods (2009), Springer, URL:: *http://springer.com/978-90-481-2330-8*

-Computational Methods for Solids and Fluids: Multiscale Analysis, Probability Aspects and Model Reduction (2016), Springer, URL*:* *http://www.springer.com/fr/book/9783319279947*

-Structural Engineering: Models and Methods for Statics, Instability and Inelasticity (2023), Springer, URL: *http://springer.com/978-3-031-23591-7*

ECCOMAS MSF 2025 Conference Course (3 ECTS)

Course Announcement

***Short Course** at 7th ECCOMAS MSF 2025*

Current Research on Solids & Fluids: Computations, FE Code Coupling, Model Reduction, Probability…

June 22 - 24, 2025

Split, Croatia

co-organized by:

UTC-Alliance Sorbonne Univ., France &

Univ. Split, Croatia &

IUF, France & ACMBH & CEACM