

HOW TO PARTICIPATE

Registration

In order to apply for this course please click on the link: <https://www.polimi.it/en/programmes/specializing-masters-and-postgraduate-programmes/399>

and insert your application as requested. The deadline for the application is **May 20th 2024**. Admission to the course follows a first-come, first-served basis.

If the minimum number of **15** participants is reached, the course will start as planned. If not, the course will be postponed or cancelled. The maximum number of participants is **50**. This communication will be sent to participants by **May 22nd 2024**, along with detailed instructions on how to proceed with the payment of the registration fee.

If necessary, the Direction may modify the course organization (program and teaching method). In case of proven and serious circumstances preventing from participating to the course, the participant has got two options:

1. To obtain the refund of the registration fee, provided that the subject student has duly informed the course staff by **June 02nd 2024**.
2. To keep on hold the registration fee, assuming the relevant amount is used for the following course session. In line with the above, this option is viable, as long as the course staff has been properly informed, again by **June 02nd 2024**.

Politecnico di Milano is only liable for the refund of the registration fees already honored.

The Institution/Company is allowed to replace a participant with another employee before the course starts, assuming the course staff has been promptly informed accordingly.

DELIVERY STRUCTURE

Department of Energy – Politecnico di Milano

COURSE DIRECTION

- Prof. Tommaso Lucchini (DENG), Director of the Course
- Prof. Paolo Schito (DMEC), Co-director of the Course

DURATION

Full (Basic + Advanced): 03rd-06th, 2024

REGISTRATION FEES

- Basic + Advanced (4 days) € **1.800** (€ 1.440 Polimi people);

Early-bird period (Feb.-Apr. 20th 2024): 10% discount; VAT is not applicable to the registration fees due to art. 10 DPR 633/26.10.72 and subsequent modifications.

Coffee break and light lunch are included.

COURSE STAFF

Specializing Master & Continuing Education Office
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Department of Energy's continuing education activities for university teachings comply with the **UNI EN ISO 9001-2015** standard.

Post-Graduate Programme
1st edition

03rd – 06th June 2024

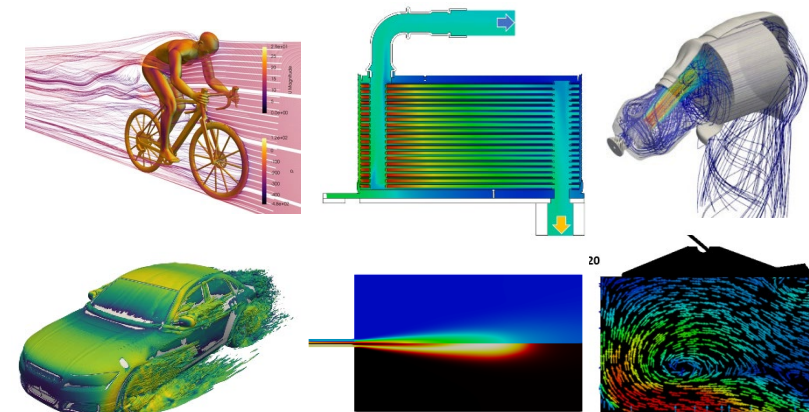


POLITECNICO
MILANO 1863

DIPARTIMENTO DI ENERGIA

OpenFOAM Training: Basic and Advanced

Learning the advantages of open-source software for CFD simulations



COURSE CONTENTS

This course is dedicated to researchers and engineers interested in Computational Fluid Dynamics simulations with the OpenFOAM® (Open Source Field Operation And Manipulation) software which is widely used in industry and academia. The course is offered in two modules: basic and advanced. The basic module is to understand the OpenFOAM simulation workflow (pre-processing, simulation, post-processing). The second module (advanced) deals with more complex and specific topics.

ENTRY REQUIREMENTS

Basic training entry requirements: Linux/UNIX environment; Basics of Computational Fluid Dynamics (CFD)

Advanced training entry requirements: Attending the basic training or knowledge of the OpenFOAM structure and simulation workflow.

TRAINING GOALS

Basic training:

- Understanding OpenFOAM architecture and workflow for CFD simulations;
- Running basic CFD cases (incompressible flows).

Advanced training:

- Advanced mesh generation skills
- Simulation of complex flows
- Running OpenFOAM on HPC environment

	Basic Training	
	June 3 rd	June 4 th
09:30-12:30	OpenFOAM overview	Incompressible flow simulations
14:00-17:00	Mesh generation overview	Basics of post-processing
	Advanced Training	
	June 5 th	June 6 th
09:30-12:30	Mesh generation and pre-processing	Dynamic meshes
14:00-17:00	Conjugated heat transfer Compressible-supersonic flows Car Aerodynamics	Post-processing in depth HPC Environments for OpenFOAM

LECTURES

Each module of OpenFoam Course consists in four 3-hour lectures. Module 1 will be on June 03rd and 04th. Module 2 will be on June 05th and 06th, 2024. Lectures will be held in person in the classroom at Politecnico di Milano.

TEACHING MATERIALS

Lectures are held in English. All participants will receive a complete set of the presentation slides with specific examples and case studies, selected reference lists and resources in electronic format.

CERTIFICATE

At the end of the course, the participants will receive a certificate of attendance, provided that they have attended at least 80% of the course lectures and that they have filled in the anonymous participant evaluation questionnaires.

COURSE PROGRAM OVERVIEW

Basic training program

- **OpenFOAM overview:** code structure, solvers, modules, utilities, tutorials;
- **Mesh generation:** examples of use of blockMesh, snappyHexMesh;
- **Incompressible flow simulations:** case setup and validation;
- **Post-processing:** flow visualization with Paraview

Advanced Training Program

- **Mesh generation with snappyHexMesh:** multi-regions, baffles, boundary layers;
- **Conjugated Heat Transfer:** case setup and tips;
- **External Aerodynamics:** mesh, turbulence models, boundary conditions and tips;
- **Flows in porous media** region handling and volume forces setup;
- **Flows in moving components:** boundary conditions for rigid rotation.
- **Posprocessing in depth:** automatic and run-time data saving and post-processing HPC Environments for OpenFOAM: workflow on HPC cluster, scalability and data management.

LECTURERS

Tommaso Lucchini: associate professor at the Energy Department of Politecnico di Milano. He has a 20-year experience in CFD model development and applications with the OpenFOAM technology for engine simulations (in-cylinder flows, gas exchange, mesh management, combustion).

Paolo Schito: associate professor at Department of Mechanical Engineering of Politecnico di Milano. His main research activity is in the field of fluid-structure interaction, in Computational Wind Engineering.

Augusto Della Torre: associate professor at the Energy Department of Politecnico di Milano. His research activity is focused on the simulation of reacting flows, catalytic substrates and heat-exchange for different applications from internal combustion engines to electrochemical devices.

Gianluca Montenegro: full professor at the Energy Department of Politecnico di Milano. He studies unsteady and reacting flows with heat transfer phenomena occurring inside intake and exhaust systems of internal combustion engines.

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