
Computational Fluid Dynamics (6 ETCS)

Responsible Staff Member: Prof. Dr.-Ing. Egbers, Christoph

Location of the course: Faculty 3 - Mechanical Engineering, Electrical Engineering and Industrial Engineering

Language: English

Learning Outcome:

Numerical simulation of fluid flow phenomena (CFD) occurring in nature and techniques (dynamics and vortex formation in flows of incompressible and compressible fluids, turbulence modeling, multiphase flows).

Within the lecture the students will learn the implementation of fluid mechanics governing equations and characteristic parameters into CFD-programs and also the handling with the open source CFD code "OpenFOAM".

The students learn to simulate fluid dynamical processes and can engross their knowledge of complex fluid mechanical problems. They can use thereby their skills in fluid mechanics and numerical mathematics.

Contents:

Practical contents on simulation of complex fluid mechanical flows will be impart within the lecture, which can be completed by self study. Within the laboratory course the students learn to simulate, to analyze and to interpret flow problems by means of application oriented examples.

What is a CFD-code; Overview and structure of the open-source code "OpenFOAM"; Accomplishment of numerical simulations with "OpenFOAM"; Governing equations of incompressible and compressible fluids, turbulence modelling, multiphase flows and their implementation in "OpenFOAM"; numerical discretization methods in "OpenFOAM"; Post-processing with the visualization tool "ParaView".

Forms of Teaching and Proportion:

Lecture - 2 hours per week per semester

Exercise - 2 hours per week per semester

oral examination

Withdrawal from Examination until the end of the seventh week of the lecture period