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# CFD WITH OPENSOURCE SOFTWARE

A COURSE AT CHALMERS UNIVERSITY OF TECHNOLOGY  
TAUGHT BY HÅKAN NILSSON

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## Proceedings

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# Preface

These proceedings consist of the outcomes of the 7.5 hec PhD course 'CFD with OpenSource Software', 2022. The course gives a thorough introduction on how to understand and modify OpenFOAM code. A major individual project work in OpenFOAM forms a large part of the course. The project is defined according to the student's special interests. The result of the project is a detailed tutorial for a specific application or library of OpenFOAM, which is presented to, and peer-reviewed by the students. The tutorials thus form a part of the course (Docendo discimus - Latin: 'by teaching, we learn'). The tutorials are made available through the proceedings, as a contribution to the OpenFOAM community, and to contribute to global learning. The tutorials are typically made available in the form of a report, a set of slides, possible source code, possible cases, and additional material, to be downloaded at [http://dx.doi.org/10.17196/OS\\_CFD#YEAR\\_2022](http://dx.doi.org/10.17196/OS_CFD#YEAR_2022).

The main requirements of a tutorial is that it should consider the following four aspects:

- How to use it
- The theory of it
- How it is implemented
- How to modify it

The word 'it' refers to the special topic of each tutorial. This should be reflected by the specified learning outcomes of each tutorial, and should be evaluated by a set of study questions.

It should be recognized that the tutorials are student project work, done as part of a course. For many of the students it is the first time they are introduced to C++ and object oriented programming. Any reader should be aware that the tutorials might not be free of errors. Still, the tutorials might be useful for someone who would like learn something similar as the students learnt while doing the project work. The material has gone through a review process. The role of the reviewers is to go through the tutorial and make sure that it works, that it is possible to follow, and to some extent correct the writing. The reviewers have no responsibility for the contents, and it is thus up to the reader to make sure that any work that is derived from one of the tutorials is verified and validated.

The Editor:  
Prof. Håkan Nilsson (Chalmers University of Technology)