FAF3703 Computational Fluid Dynamics, CFD, in Design and Development 7.5 credits

Computational Fluid Dynamics, CFD, i design och utveckling

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FAF3703 valid from Spring 2013

Grading scale

Education cycle

Third cycle

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The course introduces CFD methodology in technical design and development. Fluid flow processes and system parameters influencing indoor environment, energy use and health aspects of the indoor environment are considered.

Course contents

CFD simulations have partly replaced measurements in the design of system solutions, indoor environments and products. The CFD user has to be familiar with theory and practical applications in order to understand and evaluate simulated results. Partial differential equations and the governing equations for incompressible flows are dealt with. The finite volume method, which is used here, is the leading method in the evaluation of thermal comfort, airborne contaminant movements and health aspects in indoor environments.

Disposition

- Partial differential equations
- Navier-Stokes equations
- Turbulence modeling
- Discretisation of equations
- Initial and boundary conditions
- Preprocessing including meshing
- Solution of governing equations (Fluent)
- Convergence
- Post-processing
- Validation of results

Course literature

- H.K. Versteegh and W. Malalasekera. An Introduction to Computational Fluid Dynamics –The Finite Volume Method, Pearson Education Limited, Harlow, England, 2007.
- J. Tu, G.H. Yeoh and C. Liu, Computational Fluid Dynamics – A Practical Approach, Elsevier, 2008
- Q. Chen and J. Srebric. How to Verify, Validate, and Report Indoor Environment Modeling CFD Analyses, ASHRAE RP-1133, ASHRAE 1791 Tullie Circle, NE Atlanta, GA 30329-2305, 2001

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Active participation in seminars and individual activity 2 hp, written test 1.5 hp, Lab1 (validation) 1.5 hp, Lab2 (reporting of results) 2.5 hp.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.