Zurich University of Applied Sciences

School of Engineering

# t.CFD - Computational Fluid Dynamics (Numerische Strömungssimulation)

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| **Person responsible for the course:** | Egon Lang, lang |
| **Credits:** | 4 |
| **Valid for:** | 2010/2011 |
| **Last saved:** | 03.09.2010 09:42 |

**Learning objectives:**

The student:

- knows the benefits and limitations of numerical simulation
- knows how to evaluate simulation results critically
- can apply a systematic approach to simulate fluid flow problems
- can carry out numerical simulations of simple fluid flow problems

**Course content:**

Lecture:

- Generation of geometric models by the CAD software CATIA
- Generation of grids of various types
- Setting up a simulation (preprocessing) perfoming a simulation (solver) Evaluating the results of a simulation (postprocessing) with ANSYS CFX 10
- Interpretation and discussion of the results
- Introduction to the theory of computational fluid dynamics (finite volumes method)

Practical applications:

- Calculation of the fluid flow through a elbow
- Simulation of a simple mixing process
- Simulation of the flow around an airfoil or hydrofoil, computation of the lift and the drag force
- Calculation of the flow and the heat transfer in a pipe
- Simulation of small, self chosen problem

**Previous knowledge:**

- Basics of fluid mechanics (aerodynamics) and thermodynamics
- Knowledge of differential equations

**Teaching method:**

| Type of lesson: | Number of lessons per week: |
|---|---|
| Lecture | 14*4 |
| Tutorial/Practicum | |
| Group teaching | |
| Block instruction | |
| Seminar | |

**Assessment:**

According to the table or as specified in writing by the lecture at the beginning of the semester!

| Number | Type | Weighting |
|---|---|---|
| 1 | End of term exam | |
| | Exam during the semester | |
| | Further assessments | |

**Language of instruction:**

German

**Instruction material:**

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**Comments:**

The infrastructure required for this course limits the number of participants to a maximum of 20. Should there be more than 20 participants, the course has to be held in more than one class. Students in Aviation receive a brief introduction to CATIA to ensure that they are capable of producing geometric models.