SYLLABUS

Computational fluid dynamics 7.5 credits F7018T

Strömningsmekanikens beräkningsmetoder

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-08-22

Computational fluid dynamics 7.5 credits F7018T

Strömningsmekanikens beräkningsmetoder

Second cycle, F7018T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Strömningslära	Engineering Physics

Main field of study

Mechanical Engineering

Entry requirements

M0047M Calculus, M0048M Linear algebra and integrals, M0049M Linear algebra and differential equations, F0004T Physics1, F0006T Physics 3, or equivalent courses. F7016T Advanced Ffuid mechanics. Vector analysis as in M0032M Functions of several variables and computer tools. Good knowledge in English, equivalent to English 6.

Selection

The selection is based on 30-285 credits

Course Aim

After the course the student should know

Knowledge and understanding

- Have knowledge of approximate methods, analytical and numerical methods developed for fluid mechanics.
- Have understanding of these methods with their prons and cons
- Have knowledge of turbulence modeling and the simplest turbulence models and their prons and cons.
- Have knowledge about some commercial CFD software programs.

Skills and abilities .

- To formulate a fluid mechanical problem in terms of partial differential equations and boundary conditions in a form suitable for a numerical method.
- To formulate the fluid flow problem numerically in terms of a finite difference method and a finite volume method.
- To be able to solve a fluid mechanical problem with the use of a commercial CFD software.

Evaluation and approach

- Verify and criticize results from a numerical solution and solution using a commercial CFD software.
- Decide when more advanced simulations and experiments need to be considered.

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Contents

Numerical methods
Finite difference methods and Finite volume methods.

Turbulence modeling ,
Different turbulence models such as k-epsilon, k-omega och SST

Computer laborations
Tutorials on commercial CFD software

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
Lectures in which theory and methods are presented. Computer laborations and assignments. Assignments documented as technical report and to be handed in and graded

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The learning objectives under the heading *Knowledge and understanding, and Evaluation and approach* are examined by a written exam with the grades U G 3 4 5. The learning objectives under the heading *Skills and Abilities* are examined by technical reports of the assignments and windtunnel laboratory work. Grades U G G+ together with the written exam.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course F7018T is equal to MTM169

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Assignment	G U 3 4 5	5	Mandatory	A11	
0004	Written exam	G U 3 4 5	2.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Niklas Lehto, Head Faculty Programme Director 2022-08-22

Syllabus established

The syllabus was established by the Department of Applied Physics and Mechanical Engineering 2007-02-28, and remains valid from autumn 2007.

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