SYLLABUS

Algorithms 7.5 credits D7009E

Algoritmer

Course syllabus admitted: Spring 2024 Sp 3 - Present

DECISION DATE
2023-02-15

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LULEÅ TEKNISKA UNIVERSITET

Algorithms 7.5 credits D7009E

Algoritmer

Second cycle, D7009E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Datalogi	Computer Technology

Main field of study

Computer Science and Engineering

Entry requirements

The student should have knowledge about basic algorithms and data structures, and discrete mathematics, equivalent to the courses D0012E Algorithms and Data Structures and M0009M Discrete Mathematics.
Good knowledge in English equivalent to English 6.

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Selection

The selection is based on 30-285 credits

Course Aim

To develop knowledge and skills in constructing and analyzing algorithms and data structures, to study advanced algorithmic solutions for the problems on sets, graphs, arithmetic, network and geometry, and to investigate the computational complexity of different problems.

After the course the student should be able to

- demonstrate knowledge of the disciplinary foundation and of proven experience in the design and analysis of algorithms and data structures
- demonstrate the ability to construct, analyze and critically evaluate various algorithmic solutions with respect to correctness, efficiency, and reliability
- demonstrate the ability to identify, formulate, and mange problems of high complexity by develop computer program that use computer resources efficiently
- show knowledge of mathematical tools for analyzing algorithms
- demonstrate the ability to plan and use appropriate methods to undertake advanced tasks within predetermined parameters
- demonstrate the ability to model , predict and evaluate the events even with limited information

Contents

Algorithm analysis: Correctness and efficiency, amortized and competitive analysis
Construction principles: Dynamic programming, approximation, augmenting data structures, randomized, dynamic, parallel, and on-line algorithms.
Computational complexity: Efficiency measures, upper and lower bounds, problem reduction technique, complexity classes including P, NP, and NP-complete problems.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures. During the course there could be homework assignments that render bonus points on the written exam that follows directly after the course has been given.

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.

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.

Remarks

The credits for this course cannot be combined with the credits for SMD 073, SMD087, SMD141, och SMD160.

Overlap

The course D7009E is equal to SMD141, SMD160

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Written exam	G U 3 4 5	7.5	Mandatory	S22	

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 Robert Brännström 2023-02-15

Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28