

SYLLABUS

Algorithms and Data Structures 7.5 credits D0012E

Algoritmer och datastrukturer

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2023-02-15**

Algorithms and Data Structures 7.5 credits D0012E

Algoritmer och datastrukturer

First cycle, D0012E

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

Main field of study

Computer Science and Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and the student should have knowledge about object-oriented programming, object-oriented design, and discrete mathematics, equivalent to the courses D0009E Introduction to Programming, D0010E Object-oriented Programming and Design and M0009M Discrete Mathematics. General computer skills.

Selection

The selection is based on 1-165 credits.

Course Aim

After completing the course the student shall

- demonstrate knowledge of the disciplinary foundation and of proven experience in the design and analysis of algorithms and data structures that solve different types of problems correctly and efficiently
- demonstrate the ability to construct, analyze and critically evaluate various algorithmic solutions
- demonstrate the ability to simulate and evaluate complex computer programs
- show knowledge of mathematical tools for analyzing algorithms
- demonstrate ability for teamwork and cooperation and demonstrate ability to independently identify the need and ability to gain additional knowledge to enhance their skills
- demonstrate the ability to plan and use appropriate methods to undertake advanced tasks within predetermined parameters
- demonstrate the ability to make judgments with regard to the possibilities of technologies, and demonstrate proficiency in present and discuss their conclusions and the knowledge and arguments that form the basis for these

Contents

The course will emphasize on the techniques for algorithmic problem solving. The main focus is the problems of searching in and sorting large data sets and the algorithmic graph problems. Basic data structures investigated include queues, stacks, lists, priority queues, trees, search trees, graphs, sets, and tables. The topics to be covered also include paradigms for design of algorithms and recurrence equations, measures of algorithmic efficiency, upper bounds, analysis of algorithmic asymptotic complexity in terms of time and memory.

Realization

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

Lectures, lessons and laboratory team work carried out in a computer lab. 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 and mandatory programming assignments.

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 SMD135, SMD168 and SMD184.

Overlap

The course D0012E is equal to D0041D, D0034D, SMD184

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	3	Mandatory	A07	
0003	Written exam	G U 3 4 5	4.5	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 Robert Brännström 2023-02-15

Syllabus established

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