

## Data Structures

Datastrukturer  
6 credits

Programme course

TND004

Valid from: 2024 Spring semester

<b>Determined by</b>	<b>Main field of study</b>	
Board of Studies for Computer Science and Media Technology	Computer Science and Engineering, Media Technology and Engineering	
<b>Date determined</b>	<b>Course level</b>	<b>Progressive specialisation</b>
2023-08-31	First cycle	G2X
<b>Revised by</b>	<b>Disciplinary domain</b>	
	Technology	
<b>Revision date</b>	<b>Subject group</b>	
	Computer Technology	
<b>Offered first time</b>	<b>Offered for the last time</b>	
Spring semester 2009		
<b>Department</b>	<b>Replaced by</b>	
Institutionen för teknik och naturvetenskap		

## Course offered for

- Master of Science in Electronics Design Engineering
- Master of Science in Media Technology and Engineering

## Prerequisites

Programming in C++, mathematical concepts like series from Calculus II

## Intended learning outcomes

The aim of the course is to give students the tools to independently be able to create programs that solve practical problems dealing with large amounts of data, taking into account efficient use of time and memory. Upon completion of the course the student should fulfill the following learning outcomes.

- To propose specific data structures and algorithms to address practical problems.
- To motivate objectively the choices made, concerning chosen data structures, and relate to the known scientific results in the field.
- To analyze the trade offs, regarding efficiency in several aspects, of different data structures proposed for addressing a practical problem.
- To implement and use the data structures and algorithms in application programs.

## Course content

Algorithm analysis. Recursion. Lists, stacks and queues. Trees and tree traversals. Binary search trees, threaded trees and balanced trees. Hashing and hash tables. Priority queues and binary heaps. Sorting och searching. Graphs and graph traversals. Fundamental graph algorithms.

## Teaching and working methods

Lectures, lessons, and laboratory work.

## Examination

UPG1	Optional assignment	0 credits	U, G
LAB1	Laboratory work	3 credits	U, G
TEN1	Written examination	3 credits	U, 3, 4, 5

The optional assignment consists of two quizzes. Results on the quizzes will give credits to the computer examination (and re-examination until the month of January after the course is completed).

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Other information

### About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

### Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.