Data Structures and Algorithms

Programme course

6 credits

Datastrukturer och algoritmer

TDDC91

Valid from:

Determined by
Board of Studies for Computer Science
and Media Technology

Date determined
2017-01-25

Main field of study
Information Technology

Course level
First cycle

Advancement level
G1X

Course offered for
- Information Technology, M Sc in Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Basic knowledge of programming in Java and basic knowledge in discrete mathematics and calculus.

Intended learning outcomes
The purpose of the course is to give the student tools to independently be able to construct computer programs that use time and memory in an efficient way. Upon completion of the course the student shall be able to:

- demonstrate ability to analyze time and space complexity of iterative and simple recursive algorithms.
- explain and use the most common abstract data types and sorting algorithms.
- implement the most common abstract data types with different data structures and algorithms.
- describe established methods for design (and analysis) of algorithms in general.

Course content

- Basic notions
- Mathematical foundations for analysis of algorithms
- Fundamental abstract data types and data structures, such as lists, stacks, queues, search trees, hash tables and graphs
- Efficiency analysis of algorithms
- Sorting and searching
- Algorithm paradigms

Teaching and working methods

The lectures present the theory. The tutorials are devoted to individual work with exercises illustrating the theory. The laboratory assignments concern computer implementation of the techniques presented in the lectures.

Examination

BAS1	Work in PBL-group	1 credits	U, G
DAT1	Computer examination	2 credits	U, 3, 4, 5
UPG1	Voluntary assignment	0 credits	U, G
LAB1	Laboratory work	2 credits	U, G
UPG2	Computer hand-in assignment	1 credits	U, G

UPG1 is comprised of a collection of voluntary programming assignments that, if they are solved, give bonus points towards the course's written examination (only the first offering).

Grades

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

Other information

Design and Analysis of Algorithms. Complexity Theory

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Ahmed Rezine

Examiner

Erik Nilsson

Course website and other links

http://www.ida.liu.se/~TDDC91/

Education components

Preliminary scheduled hours: 52 h
Recommended self-study hours: 108 h