DD1321 Applied Programming and Computer Science 9.0 credits

Tillämpad programmering och datalogi

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

The official course syllabus is valid from autumn semester 2024 according to the decision of Director of First and Second Cycle Education: J-2024-0735.Date of decision: 2024-04-04

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Knowledge and skills in basic programming, 3 higher education credits, equivalent to completed course SF1511/SF1516/SF1518/SF1519/SF1521.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course.
Being registered for a course counts as active participation.
The term 'final examination' encompasses both the regular examination and the first re-examination.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student should be able:

- write structured programmes without code repetition in Python

- use and design composite data types and classes

- design and present user friendly output

- transfer data between file and program

- systematically troubleshoot and test programmes

- use abstraction as a tool to simplify the programming

- use programming interfaces

- select an appropriate algorithm for a given problem

- compare algorithms with regard to time and memory usage

- implement different algorithms for searching and sorting and give an account of their properties

- formulate and implement recursive algorithms

- model problems as search problems and implement algorithms for breadth-first search, depth-first search and best-first search

- describe basic compression algorithms and for which types of compression they are used

- implement stacks, queues, binary search trees, general trees, hash tables and hash functions and use these

- use priority queues

- use simple encryption methods and explain the principles of asymmetric encryption

- use algorithms for text searching, regular expressions and BNF syntax

- identify problems where the data structures above are useful and design simple algorithms with these

in order to

- become a good problem solver using programming

- be able to use computational methods in application projects

- acquire sufficient prior knowledge to be able to take advanced courses in computer science.

Course contents

Programming: Imperative and object-oriented programming in Python. Programming methodology. Program quality. Testing and troubleshooting strategies. Modularisation. Abstraction. Programming interfaces.

Algorithms and data structures: A systematic presentation of computer science concepts: abstract data types, algorithm analysis, recursion, stacks, queues, lists, searching, sorting, hashing, priority queues, trees, search trees, problem trees, text searching, simple syntax analysis, encryption.

Examination

- KONT - Partial exams, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LABD - Programming assignments, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LABP - Programming assignments, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

For higher grades on KONT, oral examination or digital exam is used. Which of the examination formats that will be used is stated in the course memo.

Transitional regulations

TEN1 has been replaced by KONT.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.