Linnæus University

Course syllabus

Faculty of Technology

Department of Computer Science and Media Technology

1DV516 Algoritmer och avancerade datastrukturer, 7.5 credits
Algorithms and Advanced Data Structures

Main field of study
Computer Science

Subject Group
Informatics/Computer and Systems Sciences

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved 2014-10-03
Revised 2020-09-05 by Faculty of Technology. Prerequisites are revised.
The course syllabus is valid from autumn semester 2021

Prerequisites
Introduction to programming 7.5 credits (1DV501) or Problem Solving and
Programming 7.5 credits (1DV506), and Objectoriented Programming 7.5 credits
(1DV502) or Programming and Data Structures 7.5 credits (1DV507), Basic
Mathematics 7,5 credits (1MA401) and Vector Geometry 7,5 credits (1MA403) or
Discrete Mathematics 7,5 credits (1MA462) or the equivalent.

Objectives
After the course the student should:

- have knowledge of time complexity of algorithms and ability to analyse
  algorithms with respect to this
- have knowledge of different data structures and operations related to them
- have knowledge of different sorting algorithms
- have knowledge of a number of strategies on how to create algorithms
- for all data structures, algorithms and strategies included in the course, have an
  understanding of when and how they should be applied
- understand what a NP-complete problem is and how it could be handled
- have practical ability to implement algorithms and evaluate the practical result in
  connection to the theoretical conclusions of the course

Content

The course includes:

- analysis of algorithms and time complexity
- lists, stacks and queues
- trees
- hashing
- sorting
- graph algorithms
- techniques for algorithm design
- introduction to NP-complete problems

Type of Instruction

Teaching consists of lectures, seminars and practical work. Practical work is individual.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Assessment of the student's performance is made through written examination and/or assignments which are presented orally and/or in written form. The assessment method is decided at the start of the course. Students who do not pass the regular examination are given the opportunity to do a resit examination shortly after the regular examination.

Course Evaluation

A written course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The course evaluation will be filed at the department.

Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 1DV016 Algorithms and Advanced Data Structures, 7.5 credits

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material

Required reading

Weiss, Mark Allen, *Data Structures and Algorithm Analysis in Java,* latest edition.

FTK, *Distributed material*. Pages 50.