Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

1DV016 Algoritmer och avancerade datastrukturer, 7,5 högskolepoäng

Algorithms and Advanced Data Structures, 7.5 credits

Main field of study
Computer Science

Subject Group
Informatics/Computer and Systems Sciences

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved by the Board of the School of Computer Science, Physics and Mathematics 2010-04-09

The course syllabus is valid from spring semester 2010

Prerequisites
Problem Solving and Programming 7,5 higher education credits (1DV006), Programming and Data Structures 7,5 higher education credits (1DV007), Basic Mathematics 7,5 higher education credits (1MA101) and Vector Geometry 7,5 higher education credits (1MA103) or the equivalent.

Expected learning outcomes

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 could be carried out in groups.

Examination
The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
A translation of the grade to the ECTS scale may be obtained upon request. The request for a translation should be made before the grade for the course is awarded.

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.

Other
On request, a Swedish University course certificate will be awarded upon successful completion of the course.

Required Reading and Additional Study Material
Required reading
Weiss, Mark Allen, *Data Structures and Algorithm Analysis in Java, Second Ed.*, 2007. Pages 350 (576).
DFM, *Distributed material*. Pages 50.