

ALGORITHMS AND DATA STRUCTURES, 5 credits
Algorithms and data structures (7.5 ECTS credits)

B level
ALG854

Syllabus approved by the Academic Board of the School on May 11, 2005. Effective starting autumn term 2005.



PLACEMENT IN THE ACADEMIC SYSTEM

The course is optional for students on the Master's programme in Computer Systems Engineering or Electrical Engineering.

PREREQUISITES AND CONDITIONS FOR ADMISSION

A basic course in programming.

PURPOSE AND OBJECTIVES

The course aims at providing knowledge on algorithm complexity, algorithm design and classical data structures. By the end of the course the student should know how to analyse the complexity of the code written, be able to use well-known techniques for obtaining a certain complexity when possible and know how to choose the appropriate data structures. The aim of the course is to present at least one advanced data structure and one advanced algorithm design technique.

PRIMARY CONTENTS

Abstract data types, basic data structures, recursion, divide and conquer, asymptotic analysis of execution time, algorithms for sorting and searching, data structures for searching, graph algorithms. Examples of advanced data structures: Binary Decision Diagrams. Examples of advanced algorithm design techniques: dynamic programming.

INSTRUCTION AND EXAMINATION OF STUDENTS

Instruction comprises lectures and laboratory works.

Examination is in the form of a written exam. To pass the course, all laboratory works, and the written exam, must be completed and approved. Grades for the entire course are assigned on the scale Fail (U), 3, 4, and 5 (the grading system used in most Swedish, technical educations where 3 is the equivalent to a Pass).

COURSE EVALUATION

After completion of a course, the Director of Studies is responsible for giving the students the opportunity to participate in course evaluation. The results from the course evaluation will be used for further development and planning of the course. Participation in course evaluation is anonymous. The results are communicated to the director of studies, lab leader, teachers and students. A list of results and proposed measures are reported to the school board.

COURSE LITERATURE

Mark Allen Weiss, *Data Structures and Problem Solving Using Java*. Second Edition, Addison-Wesley 2002.