



Faculty of Health, Science and Technology
Computer Science

Syllabus

Data Structures and Algorithms

Course Code:	DVGB03
Course Title:	Data Structures and Algorithms <i>Datastrukturer och algoritmer</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
DVA (Computer Science)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2018-01-29, and is valid from the Autumn semester 2018 at Karlstad University.

Prerequisites

Programming Techniques 7.5 ECTS cr and Software Development Methodology 7.5 ECTS cr. and attended course Discrete Mathematics 7.5 ECTS cr, or equivalent.

Learning Outcomes

Upon completion of the course, the students should be able to:

- give an account of the role of abstraction in software development and computer science,
- give an account of abstract data structures and their role in software development,
- give an account of the algorithms common in the field of computer science,
- give an account of the concepts behind the theory of complexity,
- combine and use abstract data structures as a general purpose design tool,
- apply the algorithms commonly occurring in computer science,
- apply the theory of complexity on simple algorithms and programmes, and
- write lab reports.

Content

The course covers basic data structures (sequence, list, stack, queue, tree, graph) and related applications.

The course covers a number of algorithms using the above-mentioned data structures: sorting, searching, hashing, and navigating within certain data structures, finding the shortest way between two nodes in a graph, finding the shortest way in a tree structure, detection of cycles, minimum spanning trees, strong components and spanning forests. The concept of heuristics is introduced. .

In addition, the course introduces evaluating algorithms and basic complexity theory.

The course includes both theory and practice. Instruction is in the form of lectures and independent study (theory) as well as exercises and group laboratory sessions (practice).

Reading List

See separate document.

Examination

Assessment is based on laboratory assignments, take-home assignments, and a written exam.

Grades

One of the grades 5 (Pass with Distinction), 4 (Pass with some Distinction), 3 (Pass), and U (Fail) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.