

Algorithms and Data Structures 2 (C003777)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0

Study time 180 h

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)

Dutch

Gent

seminar

lecture

Lecturers in academic year 2024-2025

Brinkmann, Gunnar

WE02

lecturer-in-charge

Offered in the following programmes in 2024-2025

[Bachelor of Science in Computer Science](#)

crdts

offering

6

A

[Bachelor of Science in Mathematics](#)

6

A

Teaching languages

Dutch

Keywords

Algorithm, data structure, efficiency.

Position of the course

Acquire more advanced skills in the domain of algorithms and data structures:

- learn to use common design techniques for algorithms;
- get acquainted with advanced implementations of standard data structures;

Contents

- Design of algorithms
 - Dynamic programming
 - Backtracking, branch and bound, game strategies
 - Probabilistic algorithms
- Data structures
 - Amortised complexity analysis
 - Variants of linked lists
 - Self-adjusting data structures
 - Balanced search trees
 - Advanced priority queues
 - Representing disjoint sets

(some topics not every year)

Initial competences

Being able to apply the contents of the course "Algorithms and Data structures 1".

Final competences

- 1 The student can apply advanced design techniques for algorithms and can implement standard data structures efficiently.
- 2 He/she can apply the new knowledge to practical problems and use it also in a research environment.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Extra information on the teaching methods

Classroom lectures;
Classroom exercises;
Lab sessions on PC;
Electronic teaching environment.

Study material

Type: Handouts

Name: Lecture notes'

Indicative price: Free or paid by faculty

Optional: no

References

Cormen T.E., Leiserson C.E. en Rivest R.L., "Introduction to Algorithms", MIT Press, 1990.
D. E. Knuth, The Art of Computing Programming, vol I, II, III. Addison-Wesley, 1968-1973.
Sedgewick R., "Algorithms in Java: Fundamentals, Data Structures, Sorting, Searching", Addison-Wesley, 2003.

Course content-related study coaching

Student coaching in the classroom exercise sessions and lab sessions on PC.
Use of an electronic teaching environment.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment with open-ended questions

Examination methods in case of periodic assessment during the second examination period

Written assessment with open-ended questions

Examination methods in case of permanent assessment

Oral assessment, Skills test, Written assessment with open-ended questions, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

Non-periodical evaluation: graded programming project with oral defence.
The use of generative AI is allowed, but in the oral defense it is evaluated whether all parts are well understood. If not, the project is evaluated as 0 points.

Calculation of the examination mark

Non-periodical evaluation 20% -- periodical evaluation 80%.
The score for the non-periodical evaluation will be transferred to the second examination period.