

## Algorithms and Data Structures (C002794)

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

**Credits 6.0**

**Study time 165 h**

**Course offerings and teaching methods in academic year 2024-2025**

A (semester 1)

Dutch

Gent

seminar

lecture

**Lecturers in academic year 2024-2025**

Fack, Veerle

WE02

lecturer-in-charge

**Offered in the following programmes in 2024-2025**

[Bachelor of Science in Mathematics](#)

**crdts**

6

**offering**

A

**Teaching languages**

Dutch

**Keywords**

Algorithm, data structure, complexity analysis, algorithm design, abstract datatypes

**Position of the course**

Acquire basic skills in the domain of algorithms and data structures:

- learn to use common design techniques for algorithms;
- get acquainted standard data structures and their implementations.

**Contents**

- Design of algorithms
  - Algorithm complexity
  - Recursion
  - Brute force algorithms
  - Divide and conquer algorithms
  - Greedy algorithms
  - Graph algorithms
- Data structures
  - Stacks and queues
  - Hashtables
  - Linked lists
  - Binary search trees
  - Priority queues

**Initial competences**

Knowledge of the programming language Java and basic concepts of object-oriented programming, as taught in "Programming".

**Final competences**

- 1 The student can apply 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

## Study material

Type: Syllabus

Name: Syllabus: Algoritmen en Datastructuren

Indicative price: Free or paid by faculty

Optional: no

Language : Dutch

Available on Ufora : Yes

Type: Handouts

Name: Handouts: Algoritmen en Datastructuren

Indicative price: Free or paid by faculty

Optional: no

Language : Dutch

Available on Ufora : Yes

## 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.
- T. Roughgarden, "Algorithms Illuminated", Soundlikeyourself Publishing, 2017.
- Sedgewick R., "Algorithms in Java: Fundamentals, Data Structures, Sorting, Searching", Addison-Wesley, 2003.

## Course content-related study coaching

### Assessment moments

end-of-term and continuous assessment

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

Written assessment

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

Written assessment

### Examination methods in case of permanent assessment

Oral assessment, Assignment

### Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

### Calculation of the examination mark

Continuous assessment (20%) + end-of-term evaluation (80%).