GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2024-2025

Discrete Algorithms (C003349)

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 2)	Dutch	Gent	independent work
			lecture
			seminar

Lecturers in academic year 2024-2025

Fack, Veerle	WE02	lecturer-in-charge

Offered in the following programmes in 2024-2025	crdts	offering
Master of Science in Teaching in Science and Technology(main subject Computer Science)	6	A
Master of Science in Teaching in Science and Technology(main subject Mathematics)	6	A
Master of Science in Computer Science	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Mathematics	6	A

Teaching languages

Dutch

Keywords

Combinatorial problems, algorithms, exhaustive algorithms, heuristic algorithms

Position of the course

This course aims at understanding algorithms and data structures designed for investigating discrete structures (such as sets, lists, graphs, codes, designs).

Contents

- Generation of combinatorial objects (such as subsets, k-subsets, permutations, partitions, ...) + iterators for such objects (algorithms for successor and ranking)
- Combinatorial algorithms for the generation of discrete structures (such as cliques, vertex covers, interval colorings, Steiner triple systems...), using dynamic programming, backtracking algorithms + pruning techniques (such as branch-and-bound) and metaheuristics
- Discrete algorithms in computational geometry (such as convex hull, line segment intersections, point localisation on a map, triangulations, Voronoi diagrams, ...)

Initial competences

Basic knowledge of algorithms and data structures, as covered in the courses Algorithms and Data Structures in the Bachelor in Computer Science.

Final competences

1 The students know how to use the general techniques of backtracking and heuristic search to discrete problems.
2 The students are capable of tackling a new discrete problem independently.

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, Independent work

Study material

Type: Handouts

Name: Discrete Algorithms
Indicative price: Free or paid by faculty
Optional: no
Available on Ufora : Yes
Online Available : Yes

References

- "Combinatorial Algorithms: Generation, Enumeration and Search", D.L. Kreher en D.S. Stinson (CRC Press, 1999)
- "Computational Geometry: Algorithms and Applications", M. de Berg, O. Cheong, M. van Kreveld, M. Overmars (Springer, 2008, third edition)
- "Algorithm Design", J. Kleinberg and E.Tardos (Pearson, 2006)

Course content-related study coaching

Individual contacts with lecturer, ELO.

Assessment moments

end-of-term and continuous assessment

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

Oral assessment, Written assessment

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

Oral assessment, 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 possible

Calculation of the examination mark

Continuous assessment (50%)
End-of-term evaluation (50%)
Additional requirement for passing: to obtain at least 8/20 for each of both parts. If this requirement is not met, the global score is the least of the two obtained scores. Students with a score less than 8/20 for the non-periodical evaluation are provided with an additional assignment for the second examination period.