

Course Specifications

Valid in the academic year 2018-2019

Discrete Algorithms (C003349)

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

Credits 6.0 Study time 165 h Contact hrs 45.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	Dutch	guided self-study	15.0 h
		lecture	7.5 h
		seminar: practical PC room classes	15.0 h
		microteaching	7.5 h

Lecturers in academic year 2018-2019

Fack, Veerle	WE02	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	crdts	offering
Master of Science in Business Engineering (main subject Data Analytics)	6	A
Master of Science in Business Engineering (main subject Finance)	6	A
Master of Science in Business Engineering (main subject Operations Management)	6	A
Master of Science in Computer Science	6	A
Master of Science in Mathematics	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Computer Science Engineering	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).
Competences: 1.1, 1.2, 1.4, 2.1, 2.4, 3.1, 3.2, 3.3, 4.1, 5.2

Contents

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

Guided self-study, lecture, microteaching, seminar: practical PC room classes

Extra information on the teaching methods

On request the learning material can be provided in English.

Learning materials and price

Lecture notes are available. Cost: 20 EUR

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.

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Oral examination, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Calculation of the examination mark

Non Periodical evaluation (30%)
Periodical evaluation (70%)