GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Advanced Algorithms (E765024)

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 2023-2024

A (semester 1)	Dutch	Gent	lecture
			seminar

Lecturers in academic year 2023-2024

Audenaert, Pieter	TW05	lecturer-in-charge
Pickavet, Mario	TW05	co-lecturer

Offered in the following programmes in 2023-2024	**crdts**	**offering**
Master of Science in Information Engineering Technology	6	A

Teaching languages

Dutch

Keywords

Algorithms, Data structures, Computer science (P170), Informatics (P175), Computer technology (T120)

Position of the course

To gain insight in advanced algorithms and data structures, more specifically for graphs and strings.

Contents

Sequel to Data Structures and Algorithms, covering more advanced topics:

- Algorithms on graphs: systematic searching in graph, connectivity, minimal spanning trees, shortest paths, flow networks, matching, etc..
- Algorithms on strings: search algorithms, data structures, coding, data-compression, automata, etc..
- Specific advanced applications of above topics: LZW, ARC4, DLX, DHT, AGI-SCI, VID-SFX, etc...

Initial competences

A good basic knowledge of algorithms and data structures, and an advanced experience in (object-oriented) programming.

Final competences

1 Knowledge of and insight in main graph and string algorithms.
2 To be able to apply and implement advanced and specific algorithms and data structures.

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

- Theory: Lectures.
- Seminar: coached exercises.
- Labs: Programming exercises on PC.
- Self-study

Learning materials and price

Syllabus. Additional material available online (via Ufora).

References

- CORMEN T.H., LEISERSON C.E., RIVEST R.L., en STEIN C., Introduction to Algorithms, 3rd ed., MIT Press, 2009, Cambridge, MA.
- SEDGEWICK R., WAYNE K., Algorithms, 4rd ed., Addison-Wesley, 2011, Reading, MA.
- AHUJA R.K., MAGNANTI T.L., en ORLIN J.B., Network Flows: Theory, Algorithms and Applications, Prentice-Hall, 1993, Englewood Cliffs, NJ.
- GUSFIELD D., Algorithms on Strings, Trees, and Sequences, Cambridge University Press, 1997, Cambridge, MA.
- SKIENA S.S., The Algorithm Design Manual, 2nd ed., Springer-Verlag, 2008, New York.

Course content-related study coaching

The lecturers are available for additional explanations during and after the lectures and seminars.

Assessment moments

end-of-term and continuous assessment

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

Skills test, Written assessment

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

Skills test, Written assessment

Examination methods in case of permanent assessment

Skills test

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

- permanent evaluation: skills test on the basis of programming exercises on PC
- periodic evaluation: written examination on theory and exercises, skills test on the basis of programming exercises on PC

Calculation of the examination mark

First examination period:
- Permanent evaluation: skills test on PC (20% of final mark)
- Periodic evaluation: written examination (50% of final mark) and skills test on PC (30% of final mark)

Second examination period:
- Periodic evaluation: written examination (50% of final mark) and skills test on PC (50% of final mark)

Remarks:
- Unlawful absence on an evaluation results in a mark zero for that evaluation
- A mark of ten or more out of twenty for the written examination can be transferred between the examination periods of the same academic year.
- The marks for the non-periodic skills test and the period skills test are weighted in a separate partial mark. This partial mark is calculated as a weighted sum of the mark for the non-periodic skills test (weight 40%) and the mark for the periodic skills test (weight 60%). If this partial mark is ten or more out of twenty, this partial mark can be transferred between the examination periods of the same academic year. In that case the partial mark is used in the second examination period with a weight of 50% in the final mark, replacing the skills test.
- If the mark for the written examination and/or the partial mark for the skills tests is less than 8/20, it is not possible to pass the course unit as a whole. If the final mark is ten or more out of twenty, this is reduced to the highest failing mark (i.e. 9/20).
- Students who eschew one or more parts of the assessment (written examination, non-periodic skills test, periodic skills test) can no longer pass the course, and the final mark, in case it is higher than 7/20, will be reduced to the highest non-passable mark (i.e. 7/20).