GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

NoSQL Databases (E018130)

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

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2026-2027

A (semester 2)	English	Gent

Lecturers in academic year 2026-2027

Bronselaer, Antoon	TW07	lecturer-in-charge
De Tré, Guy	TW07	co-lecturer

Offered in the following programmes in 2026-2027	crdts	offering
Bridging Programme Master of Science in Bioinformatics(main subject Engineering)	3	A
Master of Science in Business Engineering(main subject Data Analytics)	3	A
Master of Science in Bioinformatics(main subject Engineering)	3	A
Master of Science in Business Engineering(main subject Operations Management)	3	A
Master of Science in Computer Science	3	A
Master of Science in Computer Science Engineering	3	A
Master of Science in Information Engineering Technology	3	A
Exchange Programme in Computer Science (master's level)	3	A
Exchange Programme Information Engineering Technology	3	A

Teaching languages

English

Keywords

Management of 'big' data, NoSQL database technology, distributed databases

Position of the course

This course is a specialization course about NoSQL databases in which aspects of data management, that cannot be solved by conventional database technologies, are studied. Solutions to the problems of Volume, Variety, Velocity and Veracity are presented.

Contents

- Introduction: characteristics of Big Data, the CAP theorem and BASE systems.
- Distributed database technology: client/server architectures, multi-database systems, distributed storage and mobile databases.
- Key-value stores
- Document stores
- Column stores
- Graph databases
- Query languages for tree and graph structures: XPath, JSONPath, Cypher
- Formal models for document structures
- Semantic indexing
- Polyglot database systems: design and usage

Initial competences

Basic principles of data structures and relational databases

Final competences

1 Knowing and understanding the basic concepts of NoSQL databases
2 Knowing and understanding the solutions for distributed database technology
3 Understanding the principles of enforcing a schema

4 Being able to work with different NoSQL systems
5 Knowing query languages for NoSQL databases

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: Slides

Name: Slides
Indicative price: € 30
Optional: no
Language : English
Number of Slides : 560
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : Yes

References

- G. De Tré, Principes van databanken, Pearson Education Benelux, Amsterdam, 2017 (ISBN: 978-90-430-3580-4); richtprijs: 50 EURO (Dutch)

Course content-related study coaching

Exercise classes will be supervised by assistents

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

Skills test, Assignment

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

- Periodic evaluation: Open questions about theory & exercises
- Non-periodic evaluation: Query languages for NoSQL databases

Calculation of the examination mark

First and second exam period: periodic evaluation: 80%; non-periodic evaluation: 20%
The end score is the weighted mean of the periodic and non-periodic evaluation. However, students can only pass this course if they obtain a minimum score of 10/20 for **both** parts of the evaluation. If students obtain less than 10/20 for **at least one** of the parts, the following rules apply:

- If one obtains an 8/20 or 9/20 for at least one part of the evaluation, one cannot pass the whole of the course. If the final score computed with the weighted average is 10/20 or higher, this will be reduced to the highest unsuccessful mark, which is 9/20.
- If one obtains less than 8/20 for at least one part of the evaluation, one cannot pass the course. If the final score computed with the weighted average is 8/20 or higher, this will be reduced to the highest non-deliberable mark, which is 7/20.
- If a score of 10/20 or higher is obtained for the non-periodic evaluation in the first exam period, the points of the non-periodic evaluation will be transferred to the second exam period, unless the student explicitly renounces this transfer.

During the second exam period, non-periodic evaluations will consist of new assignments.