

## 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 2023-2024**

A (semester 2) English Gent

**Lecturers in academic year 2023-2024**

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

**Offered in the following programmes in 2023-2024**

	crdts	offering
<a href="#">Bridging Programme Master of Science in Bioinformatics(main subject Engineering)</a>	3	A
<a href="#">Master of Science in Business Engineering(main subject Data Analytics)</a>	3	A
<a href="#">Master of Science in Bioinformatics(main subject Engineering)</a>	3	A
<a href="#">Master of Science in Business Engineering (Double Degree)(main subject Operations Management)</a>	3	A
<a href="#">Master of Science in Business Engineering(main subject Operations Management)</a>	3	A
<a href="#">Master of Science in Computer Science</a>	3	A
<a href="#">Master of Science in Computer Science Engineering</a>	3	A
<a href="#">Master of Science in Information Engineering Technology</a>	3	A
<a href="#">Exchange Programme in Computer Science (master's level)</a>	3	A
<a href="#">Exchange Programme Information Engineering Technology</a>	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

#### Learning materials and price

- Slides
- Additional study material available via Ufora (short videoclips and articles)

#### 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 assistants

#### 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.