

## Databases (C003803)

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

**Credits 5.0**                      **Study time 150 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 2)	English	Gent	lecture
			independent work
			seminar

**Lecturers in academic year 2023-2024**

Bronselaer, Antoon	TW07	lecturer-in-charge
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**Offered in the following programmes in 2023-2024**

	<b>crdts</b>	<b>offering</b>
<a href="#">Master of Science in Statistical Data Analysis</a>	5	A

**Teaching languages**

English

**Keywords**

Relational databases, SQL, Graph databases, Data warehouses, Data quality

**Position of the course**

The global objective of this course is to provide students with theoretical knowledge as well as practical usage of database technology. The main emphasis is on usage of existing databases (interpreting and reading schemas, retrieving data in an efficient manner, verifying quality of data...).

**Contents**

- 1 Relational databases: the relational model, constraints, relational algebra, the SQL query language, use of indices and query optimization
- 2 NoSQL databases: Document stores, Key-Value stores, Graph databases, property graph models, the Cypher query language
- 3 Data warehousing: dimensional models, ETL processes
- 4 Data Quality: measurement of data quality, edit rules in the Fellegi-Holt framework, the error localization problem, minimal set covers, branch-and-bound solutions

**Initial competences**

Basic knowledge of programming

**Final competences**

- 1 Understanding the relational model for databases and being able to use a relational database
- 2 Understanding the basics of NoSQL databases in general and being able to use a graph database
- 3 Understanding the basics of data warehouse models as an analytical tool
- 4 Understanding the basics of data quality measurement and being able to apply edit rules in practice

**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

### Extra information on the teaching methods

SQL exercises will be done via the Qexr platform, which allows self-training of the SQL query language.

Important: because of COVID19, different didactical approaches can be used if this turns out to be necessary.

### Learning materials and price

- Slides
- (Scientific) articles
- E-books

Estimated price: 20 euro

### References

- S. Abiteboul, R. Hull, V. Vianu, Foundations of databases, Addison Wesley, 1995
- T. De Waal, J. Pannekoek, S. Scholtus, Handbook of Statistical Data Editing and Imputation, Wiley, 2011
- R. Kimball, M. Ross, The Data Warehouse Toolkit (3rd edition), 2013

### Course content-related study coaching

#### 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

Assignment

#### Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

#### Calculation of the examination mark

The non-periodic evaluation will account for 70% of the total score, the periodic evaluation will account for 30% of the total score.

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.

Partial exemption for the non-periodic evaluation is possible.

#### Facilities for Working Students

- SQL can be exercised via the online learning platform Qexr