

## Advanced Databases (E018441)

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

**Credits** 6.0

**Study time** 180 h

**Contact hrs**

60.0h

**Course offerings and teaching methods in academic year 2022-2023**

A (semester 1)

Dutch

Gent

lecture

30.0h

seminar

30.0h

**Lecturers in academic year 2022-2023**

Bronselaer, Antoon

TW07

lecturer-in-charge

De Tré, Guy

TW07

co-lecturer

**Offered in the following programmes in 2022-2023**

**crdts**

**offering**

[Master of Science in Business Engineering\(main subject Data Analytics\)](#)

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 Computer Science Engineering](#)

6

A

[Master of Science in Computer Science Engineering](#)

6

A

[Master of Science in Information Engineering Technology](#)

6

A

**Teaching languages**

Dutch

**Keywords**

data quality, data warehousing, NoSQL, imputation, normalisation, indexing

**Position of the course**

This course is a specialization course in which theory and applications on databases are learned. A first part of the course deals with methods for measurement and improvement of data quality. Several algorithms for detection of errors are discussed. Also methods for systematic correction of these errors are discussed. Finally, the part on data quality also deals with database normal forms and their practical use. In a second part, non-relational database models are introduced (NoSQL) and we learn about the concept of data warehousing. Finally, we study elementary storage of data and faster querying of data (indexing).

**Contents**

- Data quality: basic measurement
- Edit rules
- Functional dependencies and normal forms
- Repair of systematic and random errors
- Dynamic analysis of data quality
- Data deduplication
- Control digits
- Data warehousing: Concepts and techniques
- Primary and secondary file organization
- NoSQL solutions and distributed databases for management of Big data

**Initial competences**

basic principles of (relational) databases

**Final competences**

- 1 Understanding basic techniques for measurement of data quality.
- 2 Understanding basic techniques for improvement of data quality.

- 3 Understand the basic principles of physical database storage and indexing.
- 4 Being able to apply datawarehouse technology.
- 5 Knowing how 'Big' data can be managed via NoSQL and distributed database technology.

#### **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**

Because of COVID19, changed working methods can be rolled out if this proves necessary.

#### **Learning materials and price**

- Syllabus (In English). Additional course material is available through the electronic learning environment Ufora
- Basic price: 20 EURO

#### **References**

- R. Elmasri, S.B. Navathe, Fundamentals of Database Systems, Seventh Edition, Pearson Addison-Wesley, Boston USA, 2016 (ISBN: 9780133971330)
- T. de Waal, J. Pannekoek, S. Scholtus, Handbook of Statistical Data Editing and Imputation, Wiley, 2011 (ISBN: 978-0-470-54280-4)
- G. De Tré, Principes van databases, 2e editie. Pearson Education Benelux, 2017 (ISBN: 978-90-430-3580-4)

#### **Course content-related study coaching**

All exercise courses and the practicum are supported by assistants.

#### **Assessment moments**

end-of-term and continuous assessment

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

Written examination, Open book examination

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

Written examination, Open book examination

#### **Examination methods in case of permanent assessment**

Report

#### **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**

During examination period: Written open-book exam. If an "on campus" exam is not possible, exams will be organised via MS Teams.

Outside examination period: design exercise with report/design to be handed in half-way the course.

#### **Calculation of the examination mark**

A weighted average of both evaluations is applied with the following weight:

- Periodic evaluation: 15/20
- Non-periodic evaluation: 5/20

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**

- The non-periodic evaluation can be done at home and individually. Students have a server at their disposal.
- Refresher exercises and some SQL functionality needed during the non-periodic evaluation can be trained via the Qexr platform
- Short video recordings that summarize the course content are made available via Ufora.