Database Concepts
(W3WI_105)

FORMAL INFORMATION ON THE MODULE

MODULE #	LOCATION IN THE COURSE OF STUDY	MODULE DURATION (SEMESTER)	SEMESTER	LANGUAGE
W3WI_105	2nd academic year	1	Spring Term	English

FORMS OF TEACHING USED

Lecture, seminar, exercise, laboratory exercise, case study

FORMS OF EXAMINATION USED

EXAMINATION PERFORMANCE	EXAM DURATION (IN MINUTES)	GRADING
Written exam or combined module exam (written exam and assignment)	120	yes

WORKLOAD AND ECTS CREDITS

TOTAL WORKLOAD (IN H)	OF WHICH ATTENDANCE TIME (IN H)	OF WHICH SELF-STUDY (IN H)	ECTS CREDIT POINTS
150	55	95	5

QUALIFICATION OBJECTIVES AND COMPETENCIES

PROFESSIONAL COMPETENCE

In this module, the methodological and programming fundamentals taught in the first year of study are applied and deepened. Students can design a normalized schema of a relational database using entity-relationship data modelling and relational data modelling and program a relational database in SQL taking semantic integrity conditions into account. You can
Create SQL statements in interactive mode and know the basics of database access from application programs.

METHODOLOGICAL COMPETENCE

After completing the module, students will know how to structure an operational section of the data world properly and generate an SQL database that can be processed optimally. In addition, students will be able to access these operational databases from application programs using suitable database interfaces.

PERSONAL AND SOCIAL COMPETENCE

The students have learned how to structure the operational data world in cooperation with the user in the specialist department and how to program a database that works as efficiently as possible for the user on this basis. This requires not only subject-specific communication, but also very well-developed abstract and logical thinking skills.

OVERARCHING COMPETENCE

Database development is seen as an elementary component of the entire software development process. The database solution must therefore not only be brought together with the other parts of an application system, but must also be integrated into the rest of the company's database world.

LEARNING UNITS AND CONTENT

TEACHING AND LEARNING UNITS	PRESENCE TIME	SELF-STUDY
Databases I	33	57

Architecture and concepts of database systems - entity-relationship data model (basic model, extensions of the E-R model, hints for the structure of E-R schemas) - relational data model (relations, integrity conditions, schemas) - design of relational databases (motivation for the systematic design of relations, dependencies and normal forms, transformation of an E-R data model into a relational data model) - modeling tools - relational algebra - database language SQL (schema and table definition, referential integrity, data manipulation, data query) - services of
Database systems (e.g. transactions, ACID principle)

LEARNING UNITS AND CONTENT

TEACHING AND LEARNING UNITS	PRESENCE TIME	SELF-STUDY
Databases II	22	38

Concepts of application development based on databases (e.g. database interfaces, exemplary embedding of SQL statements in programming languages, technological aspects, performance aspects, SQL vs. NoSQL).

SPECIAL FEATURES

The examination duration only applies to the written examination as the sole examination performance.

PREREQUISITES

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LITERATURE

- Elmasri, R. A., Navathe, S. B.: Fundamentals of Database Systems, Pearson Studium, Munich, Boston (et al.)
- Kemper, A., Eickler, A: Database Systems: An Introduction, Oldenbourg, Munich
- Preiß, N.: Design and processing of relational databases, Oldenbourg, Munich and Vienna
- Silberschatz, A., Korth, H., Sudarshan, S.: Database System Concepts, McGraw-Hill Book Co., United States