

Database Modeling and Database Systems

Module Code: DLBCSDMDS

Module Type	Admission Requirements	Study Level	CP	Student Workload
see curriculum	none	BA	n/a	150 h

Semester / Term	Duration	Regularly offered in	Language of Instruction
see curriculum	Minimum 1 semester	WiSe/SoSe	English

Module Coordinator

Prof. Dr. Ralf Kneuper (Database Modeling and Database Systems)

Contributing Courses to Module

- Database Modeling and Database Systems (DLBCSDMDS01)

Module Exam Type

Module Exam

Study Format: Distance Learning
Exam, 90 Minutes

Split Exam

Weight of Module

see curriculum

Module Contents

- Fundamentals of relational databases
- Simple database queries
- Entity/Relationship (E/R) Diagrams
- database development
- Complex database queries across multiple tables
- Changing data in databases
- NoSQL database systems

Learning Outcomes**Database Modeling and Database Systems**

On successful completion, students will be able to

- describe the basic concepts of the relational data model and distinguish them from each other.
- visually model data schemas.
- know SQL queries, read data from databases, change the data stock, and have experience in their use.
- design, create, and modify SQL queries and data schemas for SQL databases, and have experience using them.
- independently design database schemas and create database queries to solve concrete problems.
- know the most important NoSQL concepts and distinguish them from each other.

Links to other Modules within the Study Program

This module is similar to other modules in the field(s) of Computer Science & Software Development

Links to other Study Programs of IUBH

All Bachelor Programmes in the IT & Technology field(s).

Database Modeling and Database Systems

Course Code: DLBCSDMDS01

Study Level	Language of Instruction	Contact Hours	CP	Admission Requirements
BA	English		n/a	none

Course Description

Stored data form the basis of many value chains of an information and knowledge society. The methodical structuring of data through data schemas therefore forms an important basis for storing information in such a way that it can be retrieved and processed quickly and easily. In addition to the structured storage of data, structured access to large amounts of data must also be possible. This course teaches students how to store data in relational data models and how to access stored data with SQL. In addition to relational database systems, modern DB systems (NoSQL) for storing and accessing data will be presented.

Course Outcomes

On successful completion, students will be able to

- describe the basic concepts of the relational data model and distinguish them from each other.
- visually model data schemas.
- know SQL queries, read data from databases, change the data stock, and have experience in their use.
- design, create, and modify SQL queries and data schemas for SQL databases, and have experience using them.
- independently design database schemas and create database queries to solve concrete problems.
- know the most important NoSQL concepts and distinguish them from each other.

Contents

1. Fundamentals of Relational Databases
 - 1.1 Basic Concepts of the Relational Data Model
 - 1.2 Find and Delete Records in the Database
 - 1.3 SQL and Relational Database Systems
2. Querying Data from a Single Table
 - 2.1 Query Data (SELECT)
 - 2.2 Query Data With Condition (WHERE)
 - 2.3 Sort Query Output (ORDER BY)
 - 2.4 Queries With Group Formation (GROUP BY)
 - 2.5 Subqueries With Nested SELECT Statements

3. Conception and Modeling of Relational Databases
 - 3.1 The Entity Relationship Model
 - 3.2 Relationships and Cardinalities in E/R Models
 - 3.3 Normal Forms of Databases
4. Creation of Relational Databases
 - 4.1 Logical Database Design Activities
 - 4.2 Mapping of the Conceptual Data Model into the Physical Data Model
 - 4.3 Generation of Tables in SQL Databases from E/R Diagrams
5. Complex Database Queries on Multiple Tables
 - 5.1 Composite Quantities (JOIN)
 - 5.2 Set Operations
 - 5.3 Data Views With CREATE VIEW
6. Manipulating Records in Databases
 - 6.1 Insert New Data Records (INSERT)
 - 6.2 Change Existing Records
 - 6.3 Transactions
7. NoSQL Database Systems
 - 7.1 Motivation and Basic Idea
 - 7.2 Selected Groups of NoSQL Systems

Literature**Compulsory Reading****Further Reading**

- Edlich, S./Friedland, A./Hampe, J./Brauer, B./Brückner, M. (2011): NoSQL. Einstieg in die Welt nichtrelationaler Web 2.0 Datenbanken. 2. Auflage, Hanser, München.
- Throll, M/Bartosch, O. (2010): Einstieg in SQL. Verstehen, einsetzen, nachschlagen. 4. Auflage, Galileo Computing, Bonn.
- Steiner, R. (2017): Grundkurs Relationale Datenbanken. Einführung in die Praxis der Datenbankentwicklung für Ausbildung, Studium und IT-Beruf. 9. Auflage, Springer Vieweg, Wiesbaden.
- Unterstein, M./Matthiessen, G. (2013): Anwendungsentwicklung mit Datenbanken. 5. Auflage, Springer Vieweg, Wiesbaden.

Study Format Distance Learning

Study Format Distance Learning	Course Type Online Lecture
--	--------------------------------------

Information about the examination	
Examination Admission Requirements	BOLK: yes Course Evaluation: no
Type of Exam	Exam, 90 Minutes

Student Workload					
Self Study 90 h	Presence 0 h	Tutorial 30 h	Self Test 30 h	Practical Experience 0 h	Hours Total 150 h

Instructional Methods	
<input type="checkbox"/> Learning Sprints® <input checked="" type="checkbox"/> Course Book <input type="checkbox"/> Vodcast <input checked="" type="checkbox"/> Shortcast <input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Exam Template	<input type="checkbox"/> Review Book <input type="checkbox"/> Creative Lab <input type="checkbox"/> Guideline <input checked="" type="checkbox"/> Live Tutorium/Course Feed