

Module description: Databases	
Module Code	t.BA.XX.DB.26HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	InIT
Module Coordinator	Jonathan Fürst
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3f 2 asynchronous lessons per semester week for each yearly starting-class + 2 weekly lab lessons per semester week in half-class groups
Module Description	Basics of relational databases: relational algebra, entity-relationship design, SQL DDL/DML, efficient and correct queries in SQL, indexes, triggers, transactions/ACID
Module Content	<p>Introduction</p> <ul style="list-style-type: none"> • Persistent storage and tailored access of data is an indispensable fundament for knowledge-intensive applications. This module presents the basics of relational database systems. The students learn how to design a database correctly, how to fill it with data and how to formulate formally correct queries on the data. <p>Theory</p> <ul style="list-style-type: none"> • a short introduction into the role of database systems and the basic underlying concepts (1 week) • relational algebra, relational bags (2 weeks) basic operations (selection, projection, join, set operations) basic query patterns keys • design: entity relationship (ER) modelling, correct ER diagrams (3 weeks) ER design elements derivation of tables from an ER design the notion of a correct ER diagram overview of the problems arising from incorrect design (normalisation theory) • SQL (6 weeks) SQL DDL/DML (create tables, insert/update/delete rows) SQL Queries (simple queries, EXIST clause, aggregation, views) • Database programming (1 week) Stored procedures Triggers • Indexes (1/2 – 1 week) Structure and purpose of indexes Application • Transactions (1/2 – 1 week) ACID principles Basics of transactions, commit, rollback Operational problems <p>Labs (Practical Exercises)</p> <ul style="list-style-type: none"> • simple and complex queries, formulated in relational algebra or SQL design exercises (how to read a design, how to evaluate a design, create an original design that conforms to a specification) hands-on work with a database management system (DBMS): creation of tables and SQL queries, triggers, transactions

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Learning Objectives (Competencies)	Students...		Competencies	Taxonomies		
	Knowing the transaction concept and ability to describe the ACID principles		F	K2		
	Knowing the fundamental structure of indexes and understanding the optimization of queries by the use of indexes		F	K1, K2		
	Knowing how stored procedures and triggers work and the ability to implement solutions for small tasks in DB programming languages		F	K2, K3		
	Ability to formulate expressions of relational algebra		F	K3		
	Ability to design and evaluate a model for a simple database application		F	K3, K4		
	Ability to formulate efficient and correct queries in SQL		F	K3		
	Understanding the basics of relational databases		F	K1, K2		
Performance Assessment	End-of-module exam	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
	written exam		90	80%	acc. to module agreement	
		Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
	Graded Labs <i>Graded labs</i>			20%	acc. to module agreement	
Classroom Attendance Requirement	None					
Learning material	<ul style="list-style-type: none"> • Slide Set • Buch "Datenbanktheorie" von Hanswalter Buff. ISBN 3-0344-0201-5. 					