

Only the german version of the module description as part of the study regulations is legally binding.

Module name	Database Systems: Design and Implementation
Module number	INF-25-Ba-W-DBDI
Responsible lecturer	Prof. Dr.-Ing. Wolfgang Lehner wolfgang.lehner@tu-dresden.de
Qualification objectives	Students are familiar with advanced concepts and techniques for implementing efficient database systems, in particular for query processing and optimization as well as the implementation of transactional properties. Through knowledge of architectural properties and the consequences of corresponding abstraction mechanisms, students have the expertise to structure large and complex software systems. They know several concepts for the realization of corresponding functionality and their selection on the basis of experimental investigations. They have personal and social skills and are able to assess the use of different implementation techniques in terms of runtime/memory space or read/write performance, depending on the requirements profile. They are able to assess the dependencies of individual system components. They can understand and eliminate the dependencies of individual system components.
Content	The module covers concepts and methods of implementing modern database systems as an example of a complex and generic software system based on the layered architecture of a database system, the techniques and concepts for the efficient implementation of a database system for multiprocessor systems (scale-up) with shared main memory, the effects of modern hardware developments such as non-volatile memory (NVRAM) or RDMA (Remote Direct Memory Access), data organization techniques in the main memory, the use of different index structures, the processing and optimization of queries based on data flow graphs and the implementation of synchronization and recovery.
Teaching and learning methods	The module comprises lectures of 2 SWS, exercises of 2 SWS and the self-studium. The language of instruction for the lectures and exercises is German.
Prerequisites for participation	In the Bachelor's degree program in Computer Science and in the Bachelor's degree program in Applied Computer Science with a specialization in Media Informatics, the competencies to be acquired in the module INF-25-Ba-DMF Data Management Foundations are required. In the Bachelor's degree program in Applied Computer Science with a specialization in Medical Informatics, the competencies to be acquired in the module INF-25-Ba-PMZ-DBE Database Engineering are required.
Applicability	In the Bachelor's degree program in Computer Science, the module is a compulsory elective module in the specialization area, which must be selected in accordance with the appendix to the examination regulations. In the Bachelor's degree program in Applied Computer Science, the module is a compulsory elective module in the specialization in Media

	Informatics and in the specialization in Medical Informatics, which must be selected in accordance with the appendix to the examination regulations n. The module creates the prerequisites for the modules listed under prerequisites for participation.
Requirements for earning credit points	The credit points are earned if the module examination is passed. The module examination consists of a non-public oral examination as an individual examination lasting 25 minutes. The examination language is German.
Credit points and grades	6 credit points can be earned through the module. The module grade corresponds to the grade of the examination.
Module frequency	The module is offered every winter semester.
Workload	The total workload is 180 hours.
Module duration	The module comprises one semester.
Accompanying literature	see: http://www.dbdi.db-tu-dresden.de