

Module Name	Data Management Foundations
Module Number	INF-IST-E-DMF
Responsible Lecturer	Prof. Dr. Dirk Habich dirk.habich@tu-dresden.de
Qualification Objectives	Students are able to correctly structure a segment of the real world by applying entity-relationship data modeling, relational data modeling, and design theory. Furthermore, they are capable of creating a relational database while considering semantic integrity constraints using appropriate tools, and querying and modifying the database using relational algebra and SQL statements based on it. Additionally, students are able to classify selected system-oriented aspects of database system architecture correctly and understand the interrelations of individual components. They also understand how database development is embedded as an essential component in an overarching software development process.
Contents	The module covers the fundamentals of the scientific field of database modeling and database system architecture. This includes theoretical knowledge of database design theory, such as the entity-relationship model, the relational data model, and physical data structures for data organization. Other topics include key aspects of database system implementation, particularly functional transformations of textual SQL queries into storage-level primitives, including specific optimization approaches, as well as the realization of non-functional properties for synchronization and error handling.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of exercises, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules Introduction to Analysis and Algebra, Multidimensional Differential and Integral Calculus, Discrete Structures, Programming and RoboLab, Algorithms and Data Structures, and Software Technology are required. In particular, basic concepts, fundamental algorithms, and architectural concepts of computer science are prerequisites.
Usability	The module is an elective module from the elective area "Orientation" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 3 of the examination regulations of the main study program in the diploma program Information Systems Engineering. The module creates the prerequisites for the modules that list it under "Prerequisites for Participation."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 90 minutes.
Credit Points and Grades	5 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every summer semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.
Accompanying Literature	- <i>Datenbanksysteme: Eine Einführung</i> , Alfons Kemper, André Eickler. Oldenbourg Wissenschaftsverlag, 2006. - <i>An Introduction to Database Systems</i> , C. J. Date. Pearson, 2003. See also: http://www.dmf.db-tu-dresden.de