



Course Specification Document

Title	Fundamentals of Databases
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Credit	5 ECTS
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Aims	This course aims to provide the student with the necessary knowledge about data management systems: their objectives, structures, languages, models, design methods, and programming, enabling him to store data in a manner that facilitates retrieval.
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Intended learning outcomes

On successful completion of this course, the student will be able to:

- Recognize the fundamentals of databases.
- Master relational algebra languages.
- Master the basics of SQL language.
- Understand database structure and models.
- Understand normal forms and normalization.
- Design databases.
- Analyze real-world information and represent it in a computational model.

Syllabus

- **Introduction to the fundamental concepts in database systems.**
- **Relational model and algebra:** Concepts of the relational model, mathematical foundations of relations, operations: basic, extended, additional.
- **SQL language:** Query options, input and modification, views, referential integrity constraints, advanced SQL.
- **Entity-Relationship model:** Fundamental concepts, extended model, transformation to relational model.
- **Normal forms and design of relational databases:** Basic normal forms, use of normalization operations.
- **Object-driven databases:** Needs and justifications, fundamental concepts, Entity-Relationship object model, object-oriented programming languages with persistent storage.
- **XML language:** Structure, markup, query languages.
- **JSON language:** General structure, properties.