# Introduction to Databases

**Course Code:** FCS-00096  
**Course Type:** obligatory

<table>
<thead>
<tr>
<th>Forms and number of hours of tuition</th>
<th>L</th>
<th>C</th>
<th>LC</th>
<th>P</th>
<th>SW</th>
<th>FW</th>
<th>S</th>
</tr>
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<tbody>
<tr>
<td>No. of ECTS credits</td>
<td>6</td>
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**Entry requirements:**  
Lecture: To acquaint students with the process of creating a relational database. Teaching how to write SQL queries to extract data from tables. Acquainting with the basics of database operation: physical organization of data in a database, indexes, and transactions.  
SW: Developing the ability to create a relational database and writing SQL queries. Teaching the basics of creating new tables and views, modifying tables structures, and inserting the data.

**Course objectives:**  
Lecture:  
- Introduction to databases; Relational algebra; Integrity constraints; SQL queries; Stages of designing a relational database. Normalization of relations; Entity-relationship diagrams; Creating the relational database scheme from E/R diagrams; Defining views; The physical organization of data in the database; Indexes. DDL and DML; Query optimization; Transactions.  
- Normalization of a relational database.  
- SQL queries: simple queries, subqueries, grouping queries, correlated queries, subqueries after FROM and SELECT.  
- Views.  
- 4. DDL and DML commands.  

**Course content:**  
Lecture:  
- Introduction to databases: Relational algebra; Integrity constraints; SQL queries; Stages of designing a relational database. Normalization of relations; Entity-relationship diagrams; Creating the relational database scheme from E/R diagrams; Defining views; The physical organization of data in the database; Indexes. DDL and DML; Query optimization; Transactions.  
- Normalization of a relational database.  
- SQL queries: simple queries, subqueries, grouping queries, correlated queries, subqueries after FROM and SELECT.  
- Views.  
- 4. DDL and DML commands.  

**Teaching methods:**  
Informative lecture, lecture problem, programming, subject exercises,  
Lecture – written exam; specialistic workshop – tests, short tests

**Assessment method:**  
Lecture - written exam; specialist workshop – tests, short tests

**Symbol of learning outcome:**  
LO1 knows the rules and is able to create a relational database schema.  
LO2 can write SQL queries to any relational database.  
LO3 can use the DDL and DML to construct and modify a relational database schema.  
LO4 describes the basics of relational database systems, mainly indexes, transactions and query optimization.

**Methods of assessing the learning outcomes:**  
LO1 Exam, project  
LO2 Exam, test  
LO3 Test  
LO4 Exam

**Student workload (in hours):**  
1. Attendance at lectures - 30  
2. Attendance at specialist workshops - 30  
3. Preparation for specialist workshops - 25  
4. Doing homework - 30  
5. Participation in student-teacher sessions - 5  
6. Preparation for exam - 8  
7. Presence during exam - 2  
8. Preparation for tests - 20  

**TOTAL:** 150

**Quantitative indicators:**  
<table>
<thead>
<tr>
<th>Student workload - activities that require direct teacher participation</th>
<th>No. of ECTS credits</th>
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<tbody>
<tr>
<td>67 (2)+(1)+(5)+(8)</td>
<td>2.7</td>
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<tr>
<td>105 (9)+(4)+(3)+(2)</td>
<td>4.2</td>
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</table>

**Basic references:**  

**Supplementary references:**  
1. T. Kyte, Expert Oracle Database Architecture: Oracle Database 9i, 10g, and 11g Programming Techniques and Solutions, 2nd edition, APress 2010

**Organisational unit conducting the course:**  
Software Department

**Author of the programme:**  
dr hab. inż. Agnieszka Drużdżel, dr hab. inż. Małgorzata Krętowska

**Date of issuing the programme:**  
Feb. 17, 2022