# SYLLABUS
# COURSE DESCRIPTION

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| **COURSE TITLE** | **Introduction to Databases** |
| **COURSE CODE** | 76209 |
| **SCIENTIFIC SECTOR** | ING-INF/05 |
| **DEGREE** | Bachelor in Computer Science |
| **SEMESTER** | 1st |
| **YEAR** | 2nd |
| **CREDITS** | 6 |

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| **TOTAL LECTURING HOURS** | 40 |
| **TOTAL LAB HOURS** | 20 |
| **ATTENDANCE** | Attendance is not compulsory, but non-attending students have to contact the lecturer at the start of the course or before starting their studies and the project work to agree on the modalities of the independent study. |
| **PREREQUISITES** | Students should have a solid mathematical foundation and be familiar with the basic programming concepts, data structures and algorithms. These prerequisites are covered in the following courses: Analysis, Introduction to Programming, Programming Project, and Data Structures and Algorithms. |
| **COURSE PAGE** | https://ole.unibz.it/<br>http://www.inf.unibz.it/~calvanese/teaching/idb/ |

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| **SPECIFIC EDUCATIONAL OBJECTIVES** | Type of course: "caratterizzante"<br>Scientific area: "discipline informatiche"<br><br>Students attending this course will have acquired the techniques and methods to address problems of database design, and to make use of the basic functionalities (definition, update, and querying of the database) of database management systems in the context of development and deployment of information systems. In addition, students will be able to develop applications that programmatically interact with a database management system. The course explicitly refers to relational databases and to the corresponding database management systems based on the SQL language. However, the taught methods and principles are of a more general nature, and can be applied also in those contexts where data models and database systems different from relational ones are adopted. |

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| **LECTURER** | Diego Calvanese |

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| **SCIENTIFIC SECTOR OF THE LECTURER** | ING-INF/05 |
| **TEACHING LANGUAGE** | English |
| **OFFICE HOURS** | Announced on the webpage of the lecturer. |
| **TEACHING ASSISTANT** | Diego Calvanese, Davide Lanti (teaching assistant) |
| **OFFICE HOURS** | Announced on the webpage of the lecturer. |
| **LIST OF TOPICS COVERED** | • Relational data model and relational algebra<br>• The SQL language<br>• Using SQL in database applications: API, embedded SQL<br>• The Entity Relationship model<br>• Conceptual database design<br>• Logical database design |
| **TEACHING FORMAT** | Frontal classroom lectures plus exercises, and project work. |

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| **LEARNING OUTCOMES** | **Knowledge and understanding**<br>• know in detail the principles of relational database systems and methods for designing and developing databases;<br>**Applying knowledge and understanding**<br>• be able to develop and query relational databases;<br>• be able to apply the own knowledge to the analysis, design, development and testing of information systems which satisfy given requirements;<br>**Ability to make judgments**<br>• be able to collect useful data and to judge information systems and their applicability;<br>• be able to work autonomously according to the own level of knowledge;<br>**Communication skills**<br>• be able to work in teams to implement software systems;<br>**Ability to learn**<br>• have acquired learning capabilities that enable them to carry out project activities in companies, public institutions or in distributed development communities;<br>• be able to learn the innovative features of state-of-the-art technologies and information systems; |

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| **ASSESSMENT** | For both attending and non-attending students:<br>• Project work to test knowledge application skills and communication skills, done alone or in small groups to present their work orally.<br>• Written exam with verification questions and questions to test knowledge and understanding and knowledge application skills. |
| **ASSESSMENT LANGUAGE** | English |

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| **EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS** | For both attending and non-attending students:<br>• Assessment 1: project work (30% of the mark)<br>• Assessment 2: written exam (70% of the mark)<br><br>Relevant for assessment 1: ability to work in teams, skill in applying knowledge in a practical setting, ability to summarize in own words.<br>Relevant for assessment 2: clarity of answers, ability to recall principles and methods used in database systems, skill in applying knowledge such as developing and querying databases.<br>• To carry out the project, the student must agree with the lecturer on its topic and scope. They are advised to do so in the initial phase of the project development (based on a first draft of the conceptual schema), to avoid that further work needs to be redone. Attending students can discuss the project during dedicated labs. Non-attending students must do so during the official office hours or contact the lecturer and agree on a specific appointments.<br>• The project is discussed typically 2-3 working days before the date set for the written exam, and the project must be handed in (as announced in OLE) two days before the date set for the discussion.<br>• To be admitted to the written exam (Assessment 2), the student must have discussed the project (Assessment 1), and the project must have been evaluated positively. In other words, **without having passed the project, the written exam cannot be taken**.<br>• At the written exam, which lasts at least 2 hours, students must carry out the design of a database, following a given specification. Moreover, they must formulate SQL queries, and possibly answer in written form questions about the topics covered in the course.<br>• To pass the exam, the student must pass both the project and the written exam. In this case, the final mark is computed as a weighted average of the project mark (30%) and the written exam mark (70%).<br><br>In case of a positive mark for the project, the project mark will count for all 3 regular exam sessions of the Academic Year (i.e., if the students fail or do not take the written exam, they keep the project mark and only need to retake the written exam). |

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| **REQUIRED READINGS** | Course Lecture Notes, made available in OLE. |
| **SUPPLEMENTARY READINGS** | Raghu Ramakrishnan, Johannes Gehrke. Database Management Systems. 3rd edition. McGraw-Hill, 2002. |
| **SOFTWARE USED** | PostgreSQL Database Management System.<br>RADB relational algebra interpreter (Java version).<br>Java development environment. |