SYLLABUS
COURSE DESCRIPTION

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

TOTAL LECTURING HOURS	40
TOTAL LAB HOURS	20
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/ http://www.inf.unibz.it/~calvanese/teaching/idb/

SPECIFIC EDUCATIONAL OBJECTIVES	Type of course: “caratterizzante” Scientific area: „discipline informatiche“ 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.

LECTURER	Diego Calvanese
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
OFFICE HOURS	Announced on the webpage of the teaching assistant.
LIST OF TOPICS COVERED	• Conceptual modeling of databases • Relational data model • Relational algebra, relational calculus and SQL • Database design theory with normalization theory • Procedural language extensions to SQL • Using SQL in database applications: API, embedded SQL
TEACHING FORMAT	Frontal classroom lectures plus exercises, and project work

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

ASSESSMENT	• Project work to test knowledge application skills and communication skills, done in small groups to present their work orally. • Written exam with verification questions and questions to test knowledge application skills.
ASSESSMENT LANGUAGE	English
EVALUATION CRITERIA AND	Assessment 1: written exercises (70% of the mark) Assessment 2: project work (30% of the mark)

CRITERIA FOR AWARDING MARKS	Relevant for assessment 1: clarity of answers, ability to recall principles and methods used in database systems, skill in applying knowledge such as developing and querying databases. Relevant for assessment 2: ability to work in teams, skill in applying knowledge in a practical setting, ability to summarize in own words. • The final mark is computed as a weighted average of the written exam mark (70%) and the project mark (30%). • At the written exam, which lasts at least 2 hours, the student will have to carry out the design of a database, following a given specification. Moreover (s)he will have to formulate SQL queries, and possibly answer in written form questions about the topics covered in the course. • To be admitted to the written exam (Assessment 1), the student must have discussed the project (Assessment 2), and the project must have been evaluated positively. In other words, **without having passed the project, the written exam cannot be taken**. • To pass the exam, the student has then to pass also the written exam, in addition to the project. In case of a positive mark, the project mark will count for all 3 regular exam sessions of the Academic Year (i.e., if the student fails or does not take the written exam, (s)he keeps the project mark and only needs to retake the written exam).

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. RADB relational algebra interpreter (Java version).