Syllabus

Descrizione corso

Titolo insegnamento	Basics in Data Management
Codice insegnamento	27359
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	ING-INF/05
Lingua	Inglese
Corso di Studio	Corso di laurea in Economia e Management
Altri Corsi di Studio (mutuati)	
Docenti	ing. Fabio Persia, Fabio.Persia@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/35741
Assistente	dr. Riccardo Billero
Semestre	Secondo semestre
Anno/i di corso	1
CFU	5
Ore didattica frontale	36
Ore di laboratorio	36
Ore di studio individuale	
Ore di ricevimento previste	
Sintesi contenuti	The course is designed to acquire basic knowledge on data formats, organization and data extraction techniques as well as basic skills in data analysis and processing. The course also introduces the software R and provides a bootcamp on Access. Specifically, it provides an overview of data management and an introduction to programming with R. It then covers file management, extraction, archiving, and data cleaning with R, the use of different data formats, including CSV and JSON, and the management, analysis, and visualization of numerical data.

	Finally, it covers the creation and use of relational databases with SQL and shows applications on economic and business data.
Argomenti dell'insegnamento	- Information Systems: Data and Information, Complex Information, Complex Data and Information, interactions with databases, Database, Database to support an organization's activities, Database description, Definition of DBMS, the importance of the DBMS, Managing a phone book, Definition of database system, ANSI-SPARC Three-Level Architecture, Example of conceptual/logical schema, Example of external schema. Application data independence, External Schema, History of DBMSs: the different data models, Functionality of a DBMS, Example of Query, Transactions, Operations in transactions, Example of Transaction ACID properties of transactions, Features of a DBMS, Example of a non-redundant database. ACID properties of transactions, Features of a DBMS, Main components of a DBMS. - Examples of Information Systems: Operational Support Systems, Management of orders and purchases, Monitoring and Control Systems, Environmental monitoring systems, Video Surveillance Systems. - Information Systems in Public Administration: Document Management, Hospital Information Systems, Patient management in a hospital, Transportation Information Systems, Airport. - Introduction to R: Manuals on R, the R environment, FAQ on R, On-line resources on R, Background, Why should I use it?, Some Caveats, Installation and Start, Some useful tidbits, Packages, Installing Packages, Creating Variables, Importing Data, Plotting Data. - Preliminary Concepts about R: How R works, Creating, listing and deleting the objects in memory, the on-line help. - Data with R: Objects, Reading data in a file, Saving data, Generating data, Manipulating objects, Converting objects, Operators, Matrix computation, Matrix Computation in R, Product Row by Column. - Relational Model: Introduction, the factors of success, Relation: definition, Relation: graphic schematization, Relation, Example (Relation), Remarks, Properties of a relation, Representation of a relation, Tables and Relations, Relation Schema, Examples of Relation Schemas, Relation on a schema, Important Notation, Example. Relation on a schema, Incomplete Information, Example of Incomplete Information, Databases and Integrity Constraints,

	Database Schema, Relational Database, Remarks, Types of constraints, Intra-relational constraints, Domain constraint, Tuple constraint, Superkey, Key, Example of Superkeys and Keys, Notes, Integrity of the entity, Example relation schema with primary key. Inter-relational constraints, Example of Inter-relational constraints, Referential integrity, Concept of referential integrity, Referential integrity: syntax, Relational notation of the example, Relational Database Example, Intra-relational constraints, Choice of keys. - SQL as DDL: Data definition in SQL, in SQL, Create Table, Data Types, Constraints, Syntax, Example DB student careers, Example DB Soccer Championship, ALTER TABLE, DROP TABLE, Creating and editing schemas of relations, Changing schemas of relations - Example, CREATE SCHEMA, DROP SCHEMA, Creating a database schema – Example. - SQL as DML: Updating Rows, Deleting Rows, Queries, Syntax, Examples, Operator LIKE, NULL Values, SQL vs. Relation as a Set, Cartesian Product, Ambiguous Names, Cartesian Product - Example, Join - Example, Cartesian Product - Example, Join - Example, Variables used in the FROM, Order by, Aggregate Operators, Aggregate Operators - Examples, Queries with Grouping, Queries with Grouping - Example, Predicates on Groupes, Predicates on Groupes - Example, Set Queries, Set Queries - Example. Exercises on SQL Queries. - JSON: What is JSON, Syntax, Data Types, Usage, Examples.
Parole chiave	Information Systems, Data Management, R, Relational Model, SQL, JSON
Prerequisiti	
Insegnamenti propedeutici	
Modalità di insegnamento	This course will be delivered through a combination of frontal lectures and labs.
Obbligo di frequenza	Attendance is strongly recommended but not compulsory
Obiettivi formativi specifici e risultati di apprendimento attesi	
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	The assessment will be made through a written examination, which

	includes questions both theoretical and inherent in solving specific problems using the different tools and techniques described during the course. Each question is assigned a maximum score; the student's final grade is calculated by summing the scores obtained on each question.
Criteri di valutazione	Grades are distributed as follows: - theoretical questions (60%) and practical questions (40 %).
Bibliografia obbligatoria	Lecture slides are made available on Microsoft Teams.
Bibliografia facoltativa	Elmasri, Navathe, “Fundamentals of Database Systems”, Pearson (in English). Atzeni, Ceri, Paraboschi, Riccardo Torlone, “Database Systems”, McGraw-Hill. Chianese, Moscato, Picariello, Sansone, “Sistemi di basi di dati ed applicazioni”, Apogeo Education-Maggioli Editore (in Italian).
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Istruzione di qualità