MANAGEMENT ENGINEERING (LM54)

(Lecce - Università degli Studi)

Teaching DATA MANAGEMENT

GenCod A003148
Owner professor MARCO SALVATORE ZAPPATORE

Teaching in italian DATA MANAGEMENT

Teaching DATA MANAGEMENT

SSD code ING-INF/05

Reference course MANAGEMENT ENGINEERING
Course type Laurea Magistrale

Credits 9.0

Teaching hours Ore-Attivita-frontale: 81.0

For enrolled in 2021/2022

Taught in 2021/2022

Course year 1

Language INGLESE

Curriculum Percorso comune

Location Lecce

Semester Primo-Semestre

Exam type Orale

Assessment Voto-Finale

Course timetable
https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

The course will be organised into four section:

1. Management Information Systems
   - Technical / technological aspects;
   - Business aspects;
   - Business Intelligence (BI) concepts;
   - Enterprise MIS;
   - The importance of data management and data quality.

2. Relational Databases, R-DBMS and OLTP
   - Introduction; core concepts and definitions; reference architectures
   - Data, Database, DBMS, RDBMS
   - Conceptual modelling: ER / EER diagrams and design reference patterns
   - Logical modelling: the mapping algorithm
   - Physical modelling
   - SQL queries
   - Introduction to NoSQL DBMS

3. Data Warehouse (DWH) and OLAP
   - Introduction; core concepts and definitions
   - Requirement analysis and elicitation
   - Use case modelling with UML 2.0 U–C diagrams
   - Conceptual modelling: DFM
   - Logical modelling: ROLAP
   - Physical modelling: DWH and data marts
   - ETL pipelines

4. Additional topics
   - Citizen Science
   - Data security
   - Data storytelling
   - Data visualisation
   - (Big) Data Quality

REQUIREMENTS

The course prerequisites only refer to the basic usage of modern OSs and basic knowledge of the filesystem management procedures.

COURSE AIMS	The course aims at introducing students to the data management domain, by focusing specifically on management information systems (MISs), database and data warehouse structure, functions and modelling. In addition, related topics will be examined as well, such as data visualisation and data storytelling, data quality and big data quality. The following learning objectives are considered:

- achieving the capability to identify featuring aspects of MISs
- learning what MIS architecture must be referred to depending on the specific business situation
- understanding how modern organisations manages information systems
- learning basic notions on databases and database management systems (DBMS)
- understanding the relational database theory
- understanding how to model a relational database from a conceptual and logical perspective
- learning how to use the SQL language to interact with a R-DBMS
- understanding multi-dimensional analysis and the DFM approach
- learning the differences between DBMS and DWH
- understanding the differences between OLAP and OLTP
- understanding the basic concepts of (big) data quality

TEACHING METHODOLOGY	The course will be provided via frontal lessons and practical session. Students will be engaged in interactive lectures during which their data modelling abilities will be checked and nurtured.

ASSESSMENT TYPE	A two-section exam is required:

1. written exam [20 pts.]. It will consists of the following parts:
   - Full data modelling exercise (a use case will be described in the exam text, along with some specific requirements, and the application of a given data modelling approach will be requested)
   - 2 or 3 SQL queries (to be applied to the proposed data model)
   - 2 or 3 open questions on theoretical aspects dealt with during the course

2. project work [10 pts.]. The project work will be performed collaboratively, in teams. During the second half of the course, a set of potential use cases and related project works will be presented to students. Students will organize themselves into groups and each group will select one use case. All the project work proposals will be based on the application of theoretical contents to a concrete/mocked use case. In their project work, students will be asked to use at least some the software tools examined during the course. Once completed, the team will have to provide an online interactive presentation of the work done (i.e., Microsoft PowerPoint presentation + practical live session, via Microsoft Teams) of no more than 30'.

FULL SYLLABUS	Please refer to the course team available in Microsoft Teams.

REFERENCE TEXT BOOKS	[1] Baltzan, P. (2022). M: Information Systems (6th Ed.). McGraw Hill Education (US).

[1] Baltzan, P. (2022). M: Information Systems (6th Ed.). McGraw Hill Education (US).
[2] Elmasri, R., Navathe, S.B. (2016). Fundamentals of Database Systems (7th Ed.). Pearsons.
[3] Golfarelli, M., Rizzi, S., (2009). Data Warehouse Design: Modern Principles and Methodologies. McGraw Hill Education (Europe).
[4] Additional teaching materials supplied by the teacher.