



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Data Management and Visualization

2021-1-F9101Q037

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#### Obiettivi

At the end of the module students will be able to select, design and query a database (relational or not) according to their application needs

Students will be able to use a NoSql database management system to acquire, memorize and query semi structured data

At the same time students will have competence related to analysis, evaluation and design of complex interactive infographics

#### Contenuti sintetici

Introduction to data management in big data context

data lifecycle

Variety: nosql models and architecture

Volume: data distribution and replication, hadoop architecture

Velocity: data architecture for capturing and elaborating near real time data

The data visualization module covers the essentials of visual design by which to design, and evaluate systems that

enable the interactive analysis of data and the flexible optimization of reporting (both in an organizational domain and in data journalism).

## Programma esteso

### 1. Introduction to big data (variety, volume and velocity )

#### 2. Data life cycle

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1. Introduction to NoSQL models

2. --

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2. \_\_\_\_

3. Graph db

3. Data integration

4. Data quality

#### 4. Volume

1. Data distribution

2. Replication

3. hadoop architecture

4. Data lake

#### 5. Velocity

1. Lambda and Kappa architecture

2. ELK architecture

## Data visualization

- Introduction to the Human Data Interaction (Definitions, main concepts and methodologies)

- Data Transformation into sources of knowledge through visual representation.

- Requirements and heuristics for high-quality visualizations: dos and donts.

- Charts and standard views: relevance and appropriateness.

- Advanced and innovative tools for data visualization and advanced quantitative analysis.

- The evaluation of the quality of visualizations and infographics.

o Qualitative assessment: expert and heuristic;

o Quantitative assessment: user tasks; inferential statistical techniques.

o Validated psychometric questionnaires and their analysis and understanding.

- Elements of visual semiotics and social semiotics.

## **Prerequisiti**

knowledge of relational model

## **Modalità didattica**

Lectures and exercises in the classroom and on virtual lab

Lectures with the support of slideware, discussion of practical cases through the forum, discussion of practical home-work projects.

During the COVID-19 emergency the course will be delivered remotely asynchronously. Some videoconferencing events will also be organized as self-assessment tests, not considered for the final evaluation

## **Materiale didattico**

G. Harrison Next Generation Databases, Apress, 2015

A. Rezzani Big data analytics Apogeo 2017

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Ware, C. (2012). Information visualization: perception for design. Elsevier.

Scientific articles and class pack provided by the lecturers.

## **Periodo di erogazione dell'insegnamento**

first semester

## **Modalità di verifica del profitto e valutazione**

written exam related to syllabus topics (40% of the final score) and project work realized alone or in group involving at least 2 of 3 V (60% of the final score)

## **Orario di ricevimento**

Please send an e-mail to the teacher to arrange an appointment

