



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Big Data Management and Analysis in Physics Research

2425-2-FDS01Q024-FDS01Q026M

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#### Aims

Provide a complete and updated picture of the use of Big Data Analytics in Physics research.

#### Contents

The Laboratory intends to provide detailed and updated examples of the use of Big Data Analytics in Physics research, with a theoretical introduction to the various methodologies, examples of real data and the possibility of analyzing concrete cases in depth.

#### Detailed program

1. Introduction to Big Data in Particle Physics and Astrophysics.
2. Introduction to Python and Jupiter Notebook.
3. Pandas dataframe and libraries for data analysis.
4. Regression techniques applied to research in Physics.
5. Decision Trees in Physics research.
6. Clustering and classification in data analysis in Physics
7. Time series in Physics research.

## 8. Neural networks in data analysis in Physics

### **Prerequisites**

Basic knowledge of Python.

### **Teaching form**

Frontal lessons and practical laboratory sessions, all activities will be held in presence. Lessons will be in instructional mode, while laboratory sessions will be in interactive mode.

### **Textbook and teaching resource**

Slides and additional material in English will be provided to students.

### **Semester**

Second semester.

### **Assessment method**

Oral exam. Discussion of exercises proposed during the laboratory sessions.

### **Office hours**

On appointment.

### **Sustainable Development Goals**

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