UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Big Data Management and Analysis in Physics Research

2526-2-FDS01Q024-FDS01Q026M

Aims

1. Knowledge and Understanding
Upon completion of the course, students will acquire:
• knowledge of the fundamental concepts of using Big Data Analytics to interpret data in Physics
2. Applied Knowledge and Understanding
Students will acquire the following skills:
• use Big Data Analytics tools to interpret data in Physics
3. Independent Judgment
Students will be able to:
• correctly interpret strategic choices for data analysis in Physics
4. Communication Skills
Students will be able to:
• clearly explain the course topics, using appropriate scientific language.
5. Learning Skills
Students will be provided with:
• the methodological skills needed to study the course topics.

Contents

The Laboratory intends to provide detailed and updated examples of the use of Bg 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 Bg 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.

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

QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE