UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Bioinformatics

**2223-1-F8203B018**

## Learning objectives

The principal aim of this course is to give a gentle introduction to biological data, to relative algorithmic analyses and simulation techniques.

*Knowledge and understanding*

All the arguments will be approached exploiting the Python programming language.

This course will give knowledge and understanding on:

- Jupyter Notebook
- Managing tabular data with the Pandas library
- Managing tabular data with the Biopython library
- File formats used in bioinformatics (FASTA, GTF)

**Ability to apply knowledge and understanding**

*At the end of the course the students will be able to:*

- *Write* Python program to manage and analyze biological data

## Contents

Introduction to Python

Introduction to Pandas

Biopython

Numpy e Matplotlib

Introduction to systems biology

## Detailed program

Introduction to Python: syntax, lists, array, dictionaries; notebook; Libraries and modules

Introduction to Numpy

Introduction to Python: accessing files, regular expressions

Introduction to Pandas: DataFrames and importing csv files

Pandas: summary functions, tables management

Biopython

From sensor to strings

Matplotlib

Introduction to systems biology

Stochastic and deterministic modelling

Relevance of parameters and combinatorial optimization

Constraint based modeling

## Prerequisites

None

## Teaching methods

Frontal lectures, activities in computer science lab.

## Assessment methods

Oral exam consisting of a personal project discussion. The project can be realised in small groups. This will not

change during the emergency,

The project allows to assess if the students have been able to transform the knowledge acquired during the course into skills.

The evaluation takes into account the ability to implement the analyses according to criterions of correctness, simplicity and maintainability.

There are no in-progress partial exams. The assessment method is the same for all students.

## Textbooks and Reading Materials

- Introduzione a Python. Per l'informatica e la data science
- Pensare in Python
- Python Data Science Handbook

## Semester

II Semester, III cycle

## Teaching language

italian

## Sustainable Development Goals

QUALITY EDUCATION