



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Making Sense of Biological Data

2021-2-F9101Q026-F9101Q027M

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#### Aims

The aim of this module is to understand the variability of the biological data. This is a complex kind of data and its nature is deeply influenced by the environment in which the living being, from which the biological data derives, is born, grown, lived and (for many reasons) will live.

The result is simple: the biological data is always coupled with "metadata" that are essential to understand its variability.

#### Contents

- Origin of biological data
- The levels of biological variability: genes, individuals, populations, species
- Genotype, phenotype and environment and their relationship
- Biological data classification (with some consideration about sensitive data management)
- Practical experiences (laboratories): biological data, their management and analysis

#### Detailed program

- Origin of biological data. Biological data derives from evolutionary processes. In this section the principal processes in evolution that are generating biological data will be summarised.

- The levels of biological variability: genes, individuals, populations, species. Variability in biological data is shown at all the hierarchic levels that will be uncovered in this section.
- Genotype, phenotype and environment and their relationship. Biological complexity is summarised by the relationships among genotype, phenotype and environment from which the individuals are originated.
- Biological data classification (with some consideration about sensitive data management). The main types of biological data are based on DNA or proteins. In this section we will show the different kinds.
- Practical experiences (laboratories): biological data, their management and analysis. This is the core of this module. Following the introduction, students will be lead by the teachers in lab experiences to manage and analyse DNA data.

## **Prerequisites**

Python basic knowledges

## **Teaching form**

Frontal lessons and lab practices.

During the Covid-19 emergency course will be held in a remote manner with videorecorded lectures and with web videoconferences events.

## **Textbook and teaching resource**

Slides and scientific papers. Materials are available on the e-learning page.

## **Semester**

Second year, second semester

## **Assessment method**

The students, will develop on-going projects on the topics seen during the lectures. The topics of the project must be analyzed by integrating the concepts of both modules.

The projects will be exposed orally on a date agreed with the teachers.

The exam will be comprehensive for both modules.

Due to the strong interdisciplinarity and the applied nature of the course, the formation of small groups will be encouraged.

**Office hours**

On appointment by email

