



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### **Bioinformatics and Biostatistics for Big Data and Real World Studies**

2324-1002-05

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#### **Title**

Bioinformatics and Biostatistics for Big Data and Real World Studies

#### **Teacher(s)**

- Daniela Besozzi
- Daniele Papetti
- Paola Rebora
- Anita Andreano
- Marco Villa
- Carlo Alberto Scirè
- Davide Bernasconi
- Isabella Castiglioni
- Elisabetta De Bernardi
- Daniele Ramazzotti
- Fabio Stella
- Marco S. Nobile
- Camilla Torlasco

#### **Language**

English

## Short description

### COURSE OBJECTIVES

*Introduction to Machine Learning and Big Data*

To cover modern methods related to artificial intelligence.

*Big Data and Real World Studies – Winter School*

To understand the different types of studies in epidemiological research and applications of bioinformatics on big data in medical research.

### TOPICS

*Introduction to Machine Learning and Big Data*

Introduction to machine learning – 2h Daniela Besozzi

Unsupervised learning – 2h Daniela Besozzi

Neural networks and deep learning – 4h Daniele Papetti

*Big Data and Real World Studies – Winter School*

Epidemiological designs – 7h Paola Rebora

Epidemiological designs – 3h Anita Andreano

Introduction to Real World Data, Geo-spatial analysis – 4h Marco Villa

Real world study – 2h Carlo Alberto Scirè

Introduction to causal models – 4h Davide Bernasconi

Computational methods for big medical-imaging data – 2h Isabella Castiglioni

Radiomics in oncological and fibrous diseases imaging – 2h Elisabetta De Bernardi

From data to models in pandemics – 2h Daniela Besozzi

Fairies in the modern world: applications and impact of artificial intelligence in cardiac imaging – 2h Camilla Torlasto

Mutational signatures in human cancers – 2h Daniele Ramazzotti

Integrative clustering of genomic data – 2h Daniele Ramazzotti

Interpretable and explainable artificial intelligence – 2h Marco S. Nobile

Computational intelligence for biomedicine and healthcare – 2h Marco S. Nobile

Bayesian and causal networks - part I – 2h Fabio Stella

Bayesian and causal networks - part II – 2h Fabio Stella

## CFU / Hours

6 / 48

## Teaching period

*Introduction to Machine Learning and Big Data*

October 18th 17.00-19.00 Daniela Besozzi - STREAMING

October 20th 17.00-19.00 Daniela Besozzi - STREAMING

October 21st 9.00-13.00 Daniele Papetti - STREAMING

*Big Data and Real World Studies – Winter School*

October 23rd 9.00-12.00 Marco Villa - IN PRESENCE  
October 23rd 12.00-13.00 Davide Bernasconi - IN PRESENCE  
October 23rd 14.00-17.00 Davide Bernasconi - IN PRESENCE  
October 23rd 17.00-18.00 Marco Villa - IN PRESENCE  
October 24th 9.00-10.00 Paola Rebora - IN PRESENCE  
October 24th 10.00-12.00 Carlo Alberto Scirè - IN PRESENCE  
October 24th 12.00-13.00 Anita Andreano - IN PRESENCE  
October 24th 14.00-15.00 Anita Andreano - IN PRESENCE  
October 24th 15.00-18.00 Paola Rebora - IN PRESENCE  
October 25th 9.00-13.00 Paola Rebora - IN PRESENCE  
October 25th 14.00-16.00 Isabella Castiglioni - IN PRESENCE  
October 25th 16.00-18.00 Elisabetta De Bernardi - IN PRESENCE  
October 26th 9.00-11.00 Daniela Besozzi - IN PRESENCE  
October 26th 11.00-13.00 Camilla Torlasco - IN PRESENCE  
October 26th 14.00-18.00 Daniele Ramazzotti - IN PRESENCE  
October 27th 9.00-13.00 Marco S. Nobile - IN PRESENCE  
October 27th 14.00-18.00 Fabio Stella - IN PRESENCE

**COURSE EVALUATION:** November 18th 10.00-12.00

## **Sustainable Development Goals**

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