



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Elementi di Biostatistica

2425-3-E4102B073

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#### Learning objectives

The aim of the course is to teach how to design an experimental or an observational study in the biomedical field, how to choose the proper statistical method in analyzing data and how to interpret the results.

#### *Knowledge and understanding*

This course will provide knowledge and understanding regarding:

- the identification, in the context of biomedical studies, of the nature of the outcome variables and of the factors potentially associated with the outcome
- the choice of the right statistical method according to the nature of the variables of interest and of the research question

#### *Applying knowledge and understanding*

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

- plan and perform the data analyses according to the nature of the variables of interest
- critically interpret and discuss the results

The course will provide a sound basis for choosing the right statistical methods as well for interpreting the results of the analyses in the context of the biomedical sciences.

#### Contents

- Introduction to the course
- Analysis of continuous responses
- Analysis of categorical responses
- Analysis of time-to-event (survival) data

## **Detailed program**

### **1. Introduction to the course**

1.1 The steps of the biomedical research and the role of the biostatistician

### **2. Analysis of continuous responses**

2.1 T-test and analysis of variance

2.2 Assumptions

2.3 Non-parametric tests

2.4 Simple and multiple linear regression

### **3. Analysis of categorical responses**

3.1 Analysis of contingency tables

3.2 Simple and multiple logistic regression

3.3 . Dose-response relationship

### **4. Analysis of time-to-event (survival) data**

4.1 Time-to-event data

4.2 Non-parametric estimate of the survivor function (Kaplan-Meier method)

## **Prerequisites**

None

## **Teaching methods**

Classes can be conducted in two formats: in the first, the instructors will present the concepts (**lecture mode**); in the second, the instructors will interact with the students by proposing problems based on real or simulated clinical

data, to be solved in groups using the specified software (primarily SAS, but also R, Excel, or data analysis or simulation web pages). Students will solve and discuss the problems, with corrections made together with the instructors (**interactive mode**).

The ratio between lecture and interactive hours will be approximately 2:1. Some lecture-mode classes will be conducted remotely (with an approximate ratio of 1:1 between in-class and remote lessons).

## **Assessment methods**

The examination will take place on a single day and will be divided into two sections:

- in the first section, participants will be required to answer open-ended questions in writing related to the course topics;

- in the second section, using the computer, one or more problems based on real or simulated data will be presented; the SAS software should be used to solve them.

In both sections, it will not be possible to consult any type of material, nor access the web.

## **Textbooks and Reading Materials**

Martin Bland – An Introduction to Medical Statistics – Oxford University Press

## **Semester**

Semester I, Cycle I

## **Teaching language**

Italian

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING

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