



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Principles of Biostatistics

2021-3-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:

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#### *Applying knowledge and understanding*

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## **Contents**

- 1. Introduction to the course**
- 2. Analysis of continuous responses**
- 3. Analysis of categorical responses**
- 4. Analysis of time-to-event (survival) data**
- 5. Insights on the methodology of clinical and epidemiological research**

## **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)

### 4.3 Regression models for survival data: the Cox proportional hazard model

## 5. Insights on the methodology of clinical and epidemiological research

### 5.1 Random sampling and random assignment, bias, confounding, causal inference

### 5.2 Power and sample size calculation in a clinical trial

### 5.3 Explorative research

### 5.4. Understanding risk: absolute risk and relative risk

## Prerequisites

None

## Teaching methods

Lectures

Computer lab with applications in SAS

**During the Covid-19 emergency period, lessons will be conducted in a mixed mode: some classroom lessons and mainly asynchronous / synchronous video lessons.**

## Assessment methods

Written exam (only for attending students)

During the course, a dataset from a real biomedical study will be provided.

Data must be analyzed using all the methods considered suitable for achieving the aims of the study.

The results must be presented following the style of a research paper.

The written exam will test the student's ability to lay out a research paper, from the description of the collected data and the aims of the work, to the justification of the chosen analysis methods and results discussion.

Oral exam

The oral exam will be based on the course textbook.

The oral exam will test the student's knowledge of the main statistical methods used in the biomedical field.

**During the Covid-19 emergency period, oral exams will be online. They will be carried out using the WebEx platform.**

## **Textbooks and Reading Materials**

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

## **Semester**

Semester I, Cycle I

## **Teaching language**

Italian

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