UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Medical Statistics

**2425-2-I0201D139-I0201D217M**

### Aims

Basic knowledge of typical sampling schemes, methodological tools of descriptive statistics and inferential statistics to set up studies and to analyse data, with attention to the features of rehabilitation data.

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

1) read and discuss scientific literature with descriptive and inferential statistical analyses
2) have a solid knowledge to be involved in the the design and implementation of studies in rehabilitation

### Contents

Basics of probability calculation
Confidence interval on the parameter p probability of an event (proportion)
Frequency tables and graphs
Order of magnitude and dispersion indicators
Gaussian Distribution (to approximate the trend of a histogram)
Confidence interval on the mu parameter
Use of the Gaussian distribution to construct confidence intervals

### Detailed program

- Calculation of probabilities (Chapter 5)
  Definition of experiment
  Sample space, simple and compound events

Probability with classical and Frequentist approach
Incompatible, dependent and independent events
Probability of union and intersection
Conditional probability

- Confidence interval on the proportion p (Chapter 9)
  Calculation of the point estimate of a probability
  Confidence interval: calculation of the interval estimate of a probability, interpretation, simulation
  Planning the interval estimate of a probability

- Organizing and summarizing data (Chapter 2 and Chapter 3)
  Construction of a frequency table for a qualitative characteristic: absolute, relative, relative frequencies %
  Graphic representation with bar and pie charts
  Construction of a frequency table for a quantitative characteristic: aggregation into classes, absolute, relative, relative % frequencies
  Graphic representation with histogram
  Synthetic indicators of the order of magnitude and variability of the quantitative phenomenon: arithmetic mean (and/or median) and standard deviation

- Gaussian Distribution and its use as a histogram approximation method (Chapter 7)
  Gaussian distribution: genesis and area calculation method

- Confidence interval on mu (Chapter 9)
  Confidence interval: calculation of the interval estimate of a mu parameter, interpretation, simulation
  Planning the interval estimation of a mu parameter

- Use of the Gaussian distribution to construct the confidence intervals in UNITS B and E
  Sample distributions of the proportion and the mean

## Prerequisites

None.

## Teaching form

9 lessons of 2 hours carried out in face-to-face mode
1 lesson of 2 hours carried out in remote delivery mode (pre-recorded video clip)
3 lessons of 2 hours carried out in interactive mode remotely (offline quizzes/assignments)

## Textbook and teaching resource

- Book: Fondamenti di statistica Micheal Sullivan III, traduzione a cura di Emma Zavarrone, Pearson 2020, diponibile anche come e-book https://www.pearson.it/opera/pearson/0-7264-fondamenti_di_statistica
- Slides
- Video clip

## Semester

First semester.

## Assessment method

Please refer to the teaching syllabus

## Office hours

Under request, via email contact with the instructor.

## Sustainable Development Goals

QUALITY EDUCATION | GENDER EQUALITY