UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistica e Data Visualization

2627-1-E4105B007

Learning objectives

The primary objective of the course is to provide students with the main tools of **descriptive statistics**, both univariate and bivariate, with particular emphasis on the representation, summarization, and interpretation of data, also through visualization techniques.

The course contributes to consolidating knowledge and understanding in the field of descriptive statistics, in line with the "**Statistics**" learning area of the degree programme.

Contents

The course is devoted to **descriptive statistics** and **data visualization** and is organized into two main parts. The first part focuses on **univariate descriptive statistics**, with particular attention to frequency distributions, graphical representations, and the main measures of location, variability, and shape. The second part focuses on **bivariate descriptive statistics**, with particular attention to the study of relationships between pairs of statistical variables through summary indices, tables, and graphical representations. Special emphasis is placed on the choice and interpretation of effective visualizations for exploring, summarizing, and communicating statistical information.

Detailed program

Module I: Univariate Statistics

- Terminology and preliminary concepts
- Frequency distributions
- Measures of location

- Measures of variability and concentration
- Main graphical representations and criteria for choosing effective visualizations
- Symmetry, kurtosis, multimodality
- Qualitative data and measures of heterogeneity

Module II: Bivariate Statistics and Graphical Representation of Relationships between Variables

- Covariance and correlation
- Simple linear regression
- Elements of partial correlation
- Analysis of variance
- Contingency tables
- Dependence between variables

Prerequisites

There are no prerequisites. However, it is strongly recommended the knowledge of basic notions of mathematics.

Teaching methods

Lessons are held in classroom, integrating theoretical principles with practicals aspects of data analysis.

The 48 hours of lectures will be in person.

Assessment methods

The method for verifying the knowledge acquired during the course is based on a **written exam**. The exam includes **open-ended theoretical questions** and **exercises** similar to those covered in class.

Textbooks and Reading Materials

Textbooks (in Italian)

- Piccolo, D. (2010), *Statistica*, Terza edizione, Il Mulino.
- Cicchitelli, G., D'Urso P. e Minozzo, M. (2022), *Statistica. Principi e metodi*, Quarta edizione, Pearson.

Reading material (in Italian)

- Cairo, A. (2020). *Come i grafici mentono*, Raffaello Cortina Editore.
- Spiegelhalter, D. (2020). *L'arte della statistica*. Einaudi

Semester

The course is scheduled in the first semester.

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION