



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Biostatistica

2627-1-F0902D004-F0902D00401

Aims

Basic knowledge of the most important statistical-methodological tools of the descriptive and inferential statistics for: design of experiments, data collection and analysis, the complexities of lab data.

The student will be able to: understand the main concepts of study design, implement statistical analysis, read the scientific literature presenting descriptive and inferential statistic results.

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 μ parameter
Use of the Gaussian distribution to construct confidence intervals
Hypothesis testing

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
- Maximum likelihood estimation of p and μ
Complementary to UNITS B and D
- Confidence interval on μ (Chapter 9)
Confidence interval: calculation of the interval estimate of a μ parameter, interpretation, simulation
Planning the interval estimation of a μ parameter
- Use of the Gaussian distribution to construct the confidence intervals in UNITS B and F
sample distributions of the proportion and the mean
- Testing hypotheses about p (Chapter 10)
- Hypothesis testing on category distribution (Chapter 12)

Prerequisites

None.

Teaching form

Teaching with frontal hours:

- 9 lessons of 2 hours held in presence mode;
- 3 lessons of 2 hours carried out remotely (pre-registered video clip);
- 4 lessons of 2 hours held in remote interactive mode (off line assignments);

Textbook and teaching resource

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

Semester

First semester.

Assessment method

Written test

- The written exam takes place on the university's esameonline platform in the laboratory
- 9 questions with 4/5 answers of a calculation required
- 1 open question
- 30 minutes
- 3 points scored for each question

Office hours

To be defined with the student by email contact laura.antolini@unimib.it

Sustainable Development Goals

QUALITY EDUCATION | GENDER EQUALITY
