UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Fundamentals of Biostatistics

2324-117R005

Aims

The course will introduce the fundamentals of biostatistics, with a particular focus on life sciences applications.
The main tools of descriptive and inferential statistics will be explained to guide the student through the typical process at the basis of an experimental study, which starts with the design of the experiment, proceeds with data analysis, and ends with the statistical interpretation and the critical analysis of the relevance of the obtained results.

Knowledge and understanding.
The student will gain knowledge about the choice of the proper sampling and statistical methods, and the interpretation of outcomes after data analysis.

Applying knowledge and understanding.
The student will be able to apply the acquired knowledge for the solution of statistical problems, in addition to organizing and handling biological data in automatic ways (practical skills on the use of spreadsheets).

Making judgements.
The student will be able to process the acquired knowledge and choose the proper statistical methods for different applications.

Communication skills.
Use of an appropriate scientific vocabulary and ability in oral/written reports

Learning skills.
Skills in literature reading and understanding, as well as in the application of the acquired knowledge for data analysis in research contexts.

Contents

Descriptive statistics.
Inferential statistics.

Detailed program

- Descriptive statistics. Introduction to statistics (types of data, collecting sample data). Summarizing and graphing data (frequency distributions, histograms, boxplots). Statistics for describing, exploring and comparing data (measures of center, measures of variation, measures of relative standing).
- Basic concepts of probability. Probability distributions. Sampling distributions.
- Inferential statistics. Estimation methods, confidence intervals. Hypothesis testing. Two sample hypothesis testing. Non-parametric methods. Multi-sample inference (ANOVA). Correlation and regression.

Prerequisites

Basic knowledge of spreadsheets.

Teaching form

16 hours of lectures and hands-on sessions.

Textbook and teaching resource

All the educational material will be available on Moodle platform.

Textbooks:
- M.F. Triola, Essentials of statistics, Pearson, 2014
- B. Rosner, Fundamentals of biostatistics, Brooks/Cole, 2011

Semester

5-6-7 February 2025

Assessment method

Written exam (60 minutes), consisting in 12 multiple-choice questions.

Office hours

On demand by e-email.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE