UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Biomedical Statistics

2627-121R-010

Aims

Contents

Detailed program

This course introduces the statistical methods used to design and analyse laboratory and biomedical data, with a focus on how to choose the right test and use it correctly, without entering the underlying mathematics. We start from experimental design: biological versus technical replicates, pseudoreplication, randomisation, blinding and batch effects. We then cover the logic of statistical inference (null hypothesis, p-value, confidence intervals and effect size), the principles of power analysis and sample size calculation, and the checks that guide the choice between parametric and non-parametric methods (normality, variance homogeneity, data transformation). The core of the course is a guided tour of the main tests and when to use them: comparisons between two groups (t-test, Welch, Mann-Whitney, paired tests), more than two groups (one-way ANOVA, Kruskal-Wallis and post-hoc tests), repeated measures and two-factor designs and categorical data (chi-square, Fisher's exact test). A dedicated session addresses the problem of multiple testing and its correction (Bonferroni, Holm, Benjamini-Hochberg FDR), including its relevance for omics data. We close with best practices for representing and reporting results (individual data points, error bars, exact p-values, effect sizes). A final session will conclude the course by hands-on exercises with GraphPad Prism on simulated datasets.

Prerequisites

Teaching form

Lectures

Textbook and teaching resource

Course materials provided by the instructor

Semester

Assessment method

Office hours

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING