

Course: Biostatistics

Teacher: Giorgio Binelli

Length: 2.5 CFU (20 hours)

Objective:

All fields of modern biology cannot be successfully approached without a knowledge of their statistical and biometrical aspects. It is thus necessary to provide the student with interlaced biological and statistical knowledge. The goal of this course is to make the students familiar with the statistical theory and terminology, so to understand the power and pitfalls of statistical analysis, with special emphasis on the planning of the experiments and the analysis of experimental data in the field of Life Sciences.

COURSE TOPICS

Basics of statistical analysis

- Why use Statistics. Populations and samples. Basics of probability. Random variables.
- Frequency distributions; what is a statistical test: power and protection of a test, Type I and Type II errors.

The most common statistical tests

- Quantitative and qualitative variables – which test?
- Some uses of the z variable.
- The χ^2 test. Goodness-of-fit test and comparisons between proportions.
- The General Linear Model (GLM)
- Some uses of Student's t

Other statistical tests

- The model of Analysis of Variance (ANOVA).
- One-Way ANOVA: the completely randomised and the randomised block designs. Two-way ANOVA.
- Linear regression and correlation models, parameters estimate in linear, multiple and curvilinear regression.