

Experimental design and biostatistics for life-scientists: good practices, misuse and pitfalls.

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1 ECTS

Summary The course aims to explain the importance of biostatistics for science reproducibility/reliability and teach good practices. The lectures are tailored to biologists and concentrate on logic thinking: no heavy mathematics. Particular emphasis will be placed on experimental design (power, independence, randomization), analysis (multiple comparisons, repeated measures, limitations of p-values, choosing the appropriate tests) and presentation (graphical display, errors, principal information to disclose) and statistics in grant writing.

Course schedule & location in 2020

- **Session 1** – February 17: 9-13h in [Bugnon 27, Salle LIPARI, 1st floor, west wing](#)
- **Session 2** – February 18: 9-13h in [Bugnon 27, Salle LIPARI, 1st floor, west wing](#)
- **Session 3** – February 24: 9-13h in [Bugnon 27, Salle LIPARI, 1st floor, west wing](#)

Content of course sessions

- **Session 1:**
Introduction and statistical design
 - A digestible introduction to biostatistics
 - Design: sampling and independence
 - Design: power**Analysis 1**
 - P-values and tests: misconceptions, misuse and good practices
 - Multiple comparisons: The ANOVA family and beyond
 - Problem-based learning (collective)
- **Session 2:**
Analysis 2
 - Correlation and regression (linear, logistic)
 - The Chi² family
 - Bits of odds-ratios and related concepts
 - Problem-based learning**Presentation and reporting**
 - Graphs and text: *the dos and don'ts*
 - Overview of existing statistical guidelines
 - Problem-based learning

- Biostatistics in grant writing
- **Session 3: Unexpected/bothersome amendments in real-life research**
 - Handling missing values and outliers
 - Covariates 1: ANCOVA
 - Covariates 2: Multiple regression
 - Problem-based learning

Evaluation Collective and group-organized problem-based learning (PBL) with made-up examples during the course. Collective PBL will be cases we will all discuss together. For group-based PBL, groups will have 10 min to prepare a case and 5 min to present it.

Registration The course is limited to 20 participants. Register before January 31, 2020 by writing a mail to ulrike.toepel@unil.ch (with your supervisor in copy) and stating the course title as subject.