

Syllabus – Introduction to Statistics in R

Location / Time: CIP-Pool WNDE (DE._0.135), Sept 30 – Oct 11 2019, 9 – 12 am

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Target group of the course: Students and PhD students of biology and similar disciplines with basic statistical knowledge (e.g. compulsory bachelor lecture for biostatistics) and with little or no prior knowledge in R.

Learning objectives: The aim of the course is to be able to understand and interpret fundamental concepts of statistics; to choose the right tool among basic statistical methods for typical (biological) studies; to apply these methods in the statistic software R; to interpret the results of these analyses correctly; and to design experiments and the collection of data.

Course type / Language: Lectures, computer exercises and group work. Language of the course is English.

Certificate / Evaluation: To obtain 2 ECTS: attendance and accomplishment of a small project (analysis of a dataset) subsequent to the course. If needed, a grade can be given based on an oral exam on the project work and the basic concepts taught during the course. PhD students can obtain 1.5 ECTS for attendance only (without project) according to RIGeL rules.

Software (in case you want to use your own laptop):

- R – freely available at <https://www.r-project.org/>
- RStudio – freely available at <https://www.rstudio.com/>

Course materials:

- at GRIPS

Schedule

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday
09 – 12	Introduction Aims and methods of statistics Data types and representation (in R)	Univariate descriptive statistics Graphics in R	Correlation and Causation Multivariate methods	Statistical inference Hypothesis tests and error rates	Important statistical tests (Exercise day)

Week 2	Monday	Tuesday	Wednesday	Thursday	Friday
09 – 12	Maximum Likelihood and simple linear regression	Multiple linear regression (OVB)	Generalized linear models	Experimental design und replication Teaser: Advanced methods	Data management in R (Exercise day)