

Course offered for the STAT PhD program starting from a.y. 2021/2022

TITLE	Basics of applied statistics and probability: applications with R
Lecturer	Barani Simone, Chiantore Mariachiara
Duration and Credits	3 + 3 CFU (tot. 6 CFU)
Course description	The course aims at providing the student with basic knowledge of standard tools for statistical analysis of data. In particular, most of course focuses on the use of a number of tools included in the R package. Practical exercises will be preceded by a set of theoretical lessons aimed at presenting basic concepts of probability and statistics. These are fundamental to a correct understanding of the R tools. The course is tailored primarily for graduated students in Geology and Biology.
Course organization	The course is divided into two moduli: 1) The first modulus deals with basics of probability and statistics from a theoretical perspective. The following topics will be discussed: discrete vs continuous random variables; discrete probability distributions (e.g., binomial distribution, Poisson distribution); continuous probability distributions (e.g., normal and lognormal distributions, Gumbel distributions); definition of major statistical descriptors (mean, mode, and quantiles); uncertainty vs variability; statistical hypothesis tests (e.g., chi-square test, K-S test); basics of regression analysis; introduction to stochastic processes (e.g., random walk). 2) The third modulus will address fundamental uni- and multi-variate analyses, such as one way and multi way ANOVA, regression, model selection in case of multiple regression, cluster analysis and ordination (PCA and MDS) and multivariate hypothesis testing (PERMANOVA). All the theoretical lessons will be complemented with practical sessions using R packages.
Teaching period	January-February (first module), June or September (second module). Students are invited to contact the reference lecturers to schedule the class.

Info:

- TITLE: it needs to be short, informative and possibly of broad interest to PhD Scholars
- Main Lecturer: Preferably, the Lecturer should be one of the faculties (RTD / RTI / PA /PO), or, if external to University, a recognized scientist with outstanding reputation and high quality publication record.
- Duration and Credits. In the PhD program, 4 hours of activity is classified as 1 CFU.
- Course description: not exceeding 150 words. Clearly state the aims and the content of the course. State what prerequisite students shall have before registering to the course.
- Course organization: simply state how the course will be organized, whether it will consist of frontal lessons, practical, tutorials or field activity, or a combination of these.
- Teaching period: try to schedule the course according to your needs (e.g., April – May)