



School of Advanced Studies

## SAS ACTIVITIES 2016 to acquire transferable skills

*Statistics and Data management*

# Statistics and Data Management

**Federico Maria Tardella**

UNICAM

**Camerino 2016 - SAS Computer Room**

**October 3**, from 9.30 am to 12.30 am; from 3 pm to 5 pm

**October 4**, from 9.30 am to 12.30 am; from 3 pm to 5 pm

**October 5**, from 3 pm to 6 pm

**October 6**, from 9.30 am to 12.30 am

### **Seminars programme:**

**Introduction to R.** The R environment. Installing R-packages. Essentials of the R language. Objects. Vectors, matrices, arrays, factors, lists, data frames. Functions and arguments. Managing data with R: reading, importing and saving data; subsetting.

**Introduction to statistics.** Definitions. Experimental design and data sampling. Random sampling. Replication. Pseudoreplication. Autocorrelation. Inference.

**Descriptive statistics and graphics.** Summary statistics and graphical display of distributions.

**Probability and distributions**

**Estimation and hypothesis testing.** Statistical tests. Null hypothesis. Significance. One-sided and two-sided tests. Power of a test.

**One-sample tests.** Testing distribution normality. One-sample t-test. Wilcoxon signed-rank test.

**Two-sample tests.** Comparing two variances. Comparing two means. Tests on independent samples: t-test; Wilcoxon-Mann-Whitney rank-sum test and Mann-Whitney U-test. Tests on dependent samples or paired data: paired t-test; Wilcoxon test. Testing for independence in contingency tables.

**K-sample tests.** Analysis of variance. One-way, independent measures ANOVA, pairwise comparison and multiple testing. Kruskal-Wallis test. One-way, repeated measures ANOVA. Friedman's test.

**Correlation**

**Regression.** Simple linear regression, non-linear regression, multiple regression.

**Analysis of covariance**

Each part of the program will be composed of theory, examples, and exercises using R. Individual PC needed