

Statistics with R

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Date and Time: 26 June 2019, 09:00 - 16:30h, 27 June 2019, 08:30h – 16:30h

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Day 1

[Part I - 09:00 - 11:00h] **Organisation:** Content, Round of introductions; **Basics of R:** R Manuals; Task Views on CRAN; R; **RStudio:** Overview, Tipps and Tricks; **Help!:** R Help-system and other useful resources; **Package Handling;**

[Coffee Break – 11:00 - 11:15h]

[Part II - 10:45 - 12:15h] **Data Import and Export:** flat files, other filetypes: MS Excel, SPSS, Stata etc.; Official recommendations; Some notes about databases; **R built-ins:** rda-format; **External packages:** foreign, data.table, etc.; *Exercises;*

[Lunch Break – 12:15 - 13:15h]

[Part III - 13:15 - 14:45h] **Atomic Types in R:** Overview; **Core object classes: vector und list:** Basics; Attributes; **Working with Data:** Assignment Operator; List subset (binary); **Subsetting (Indexing):** 4 different kinds of, subset-functions; **Data Information:** is.-family; which etc.; **Data Conversion:** as.-family; *Exercises;*

[Coffee Break – 14:45 - 15:00h]

[Part IV - 15:00 -16:30h] **Basic Statistical Analyses in R:** Overview; Basic (univariate) functions; external packages: psych and Hmisc; apply-family: introduction; **Multivariate Statistical Analysis in R:** Correlation and Covariance; **Graphics in R:** Barchart, Boxplot, Histogram, Scatterplots (grouped, SPLOM); *Exercises;*

Day 2

[Part V - 08:30 - 10:00h] **Case Study I – (topics day 1):** Import a data set (diamonds.csv), Data Understanding: check the data set (using summary, str, head, tail etc.); Select some subgroups and reduce the number of variables; Request some univariate statistics; Data Understanding: SPLOM and Correlation Matrices;

[Coffee Break– 10:00 - 10:15h]

[Part VI - 10:15 - 12:15h]: **Transformations and Manipulations:** Indexing and Subsetting; Missing Values Handling; Replace values by other values; Factor manipulation; **Merging; Statistical Tests in R:** Overview and References, Selected Tests, Other packages; *Exercises*;

[Lunch Break– 12:15 - 13:15h]

[Part VII – 12:45 - 14:15h] **Functions in R:** Overview; Setup; Scoping; *Exercises*; **Split-Apply-Combine-Approaches (and loops):** Overview and Applications; Using own and anonymous functions; *Exercises*;

[Coffee Break – 14:15 bis 14:30 Uhr]

[Part VIII – 14:30 - ~16:00h] **Machine Learning in R:** Overview; Framework: caret; Some typical cases; (*Exercises*);