

- Faculté des sciences économiques
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## Statistical softwares

### Characteristics

- 3 ECTS credits
- Compulsory course for master in statistics
- Autumn Semester
- Practical course: 2 hours
- Evaluation : homework exam for the R part and 1.5 hours practical exam for the SAS part
- Prerequisite : no

### Teaching Team

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### Objectives

The seminar introduces two important statistical softwares: R and SAS. In the end of this seminar, the students should be able to use these two softwares, to interpret and analyse an output.

### Contents

#### An introduction in R

- The uses of R, R objects, vectors, matrices, lists, data frames.
- Looping, graphics, random numbers.
- R packages.
- Simple examples of statistical analyses (simple regression, multiple regression, generalized linear models, anova).

#### An introduction in SAS

- The uses of SAS, the SAS windows, and the SAS language.
- Methods to input data into SAS, to create and modify SAS data sets.
- Flow control statements, random numbers, specific procedures.
- Simple examples of statistical analyses (simple regression, multiple regression, generalized linear models, anova).

**Exercices** : during the seminar.

### Textbooks

For R:

- Peter Dalgaard, *Introductory Statistics with R*, Springer, 2002.
- Michael J. Crawley, *Statistics, An Introduction using R*, Wiley, 2005.
- Brian Everitt, *An R and S-plus Companion to Multivariate Analysis*, Springer, 2005.
- John Maindonald and John Braun, *Data Analysis and Graphics Using R*, Cambridge University Press, 2003.
- Paul Murrell, *R graphics*, Chapman & Hall/CRC, 2005.

- Julian J. Faraway, *Linear Models with R* and *Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models*, Chapman & Hall /CRC, 2004 and 2005.
- W. H. Braun and D. J. Murdoch, *A First Course in Statistical Programming with R*, Cambridge University Press, 2007.

For SAS:

- G. Der and B. S. Everitt, *A handbook of statistical analyses using SAS*, Chapman & Hall / CRC, 2002.
- R. Cody, *Learning SAS by Example: A Programmer's Guide*, SAS Publishing; Pap/Cdr edition, 2007.