

14D004

Computing Lab

3 ECTS

Overview and Objectives

The computing lab introduces students to the programming techniques and hacking skills required for data science. The course covers the topics of the concurrent theory courses of the first trimester (“Statistical Modelling and Inference” and “Deterministic Models and Optimization”) and applies the techniques introduced in these theory classes on real and simulated data. The computing lab focuses on the use of scientific scripting languages and special attention is devoted to the R language and working in a unix environment. The course also introduces students to the computing environment that is used throughout the program. The course aims at developing the problem solving and operational skills needed for data science.

Course Outline

The course covers the following list of topics:

A. R Programming

- Language and environment
- Control structures, functions, scripting
- Graphing tools
- Introduction to C for R

B. Statistical Modelling and Inference

- Linear Models
- Multilevel Models
- Classification
- Simulation Techniques

C. Optimization

- Linear Programming
- Convex optimization
- Graphs

Exercises and Required Activities

Weekly Homework and Project

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Evaluation

Final Exam, Weekly Homework and Project

Materials

“Software for Data Analysis: Programming with R”, John Chambers, Springer 2008

Lecture Notes

Code Samples