UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

R Laboratory For Biostatistics

2122-1-F8203B044

Learning objectives

The course aims to provide the theoretical basis and knowledge of R useful for the management and analysis of data collected through an experimental or observational design. It will provide examples of machine learning techniques in this context.

Knowledge and understanding

This teaching will provide knowledge and understanding in relation to:

- the management of data with R
- the use of different models and biostatistical techniques in the R environment
- the application of machine learning techniques for classification and selection of variables in experimental and observational studies

Ability to apply knowledge and understanding

At the end of the course the students will be able:

- to manage database with R for a correct visualization of information
- to analyze with the R language the data coming from an experimental or observational study
- to apply classification techniques and variable selection in the construction of statistical models

Contents

Management of database with R

Statistical methods for the analysis of the main experimental and observational designs in R

Machine learning methods in R for the classification and selection of variables

Detailed program

Management of data with R: i) Introduction to R language, ii) methods for cleaning data, iii) methods for reporting and visualization of data

Statistical methods for the analysis of the main experimental and observational designs in R: i) analysis of a crossectional study, ii) analysis of a cohort study, iii) analysis of a case-control study, iv) analysis of an experimental study

Machine learning methods in R for: i) evaluating the discriminant performance of a diagnostic test, ii) selecting variables for multiple regression models

Prerequisites

No formal prerequisites. It requires, however, knowledge of the content of the following courses: Statistical models

Teaching methods

Lectures and computer lab classes

If the Covid-19 emergency period will continue, the lessons and the computer lab classes will be recorded and available online on the elearning page. Will be scheduled some video-conferences in streaming.

Assessment methods

Final test mode

Lab work of analysis of real data. The report of this work will be deliver one week before the oral test. The oral test which consists in the exposition of the work done.

In this way the teacher will be able to evaluate the students' critical processing capacity of the methods applied and the results obtained.

There are no intermediate exams.

The exam is the same for attending and non-attending students.

The rules described above may undergo variations based on the progress of the Covid-19 emergency. If changes are necessary, they will be promptly made available on this page.

Textbooks and Reading Materials

Slides from http://elearning.unimib.it/. Other material will be provided by the teacher

Semester

I semester, II period (from November to January).

Teaching language

The language of the course is the Italian. Scientific text and articles are in English language.