SYLLABUS DEL CORSO

Analisi Esplorativa

2526-2-E4101B042-E4101B042-2

Learning objectives

The course aims at introducing multivariate statistical techniques both from the methodological and from the applicative point of view.

Contents

Exploratory Analysis (6 CFU) offers an introduction to the statistical analysis of multivariate observations with the goal of dimensionality reduction thereby facilitating the understanding of the data.

Detailed program

- Graphical representation of multivariate data
- Total and generalized variance
- Spectral decomposition theorem
- Principal components analysis
- Cluster analysis: K-means and hierarchical methods
- Factorial analysis

Prerequisites

Knowledge of the notions given in the courses "Statistics I", "Probability", "Matrix Algebra", and "Statistical

inference (Statistics II)" is required.

Teaching methods

The course is delivered in Italian and includes both classroom lectures and computer lab sessions.
The classroom lectures aim to deepen the student's theoretical knowledge on the course topics and their formalization. The computer lab sessions focus on the implementation aspects of the models on real and simulated data using the R software.

In particular the course includes a total of **42 hours** of lectures conducted in person, with 7 of these hours taking place in the computer lab. Additionally, tutoring activities will be provided to support students, conducted remotely in synchronous mode.

Assessment methods

The exam for **Exploratory Analysis**

- is divided into two parts: the *first written* part consists of 3 open-ended questions, including theoretical questions and numerical exercises to be solved without the use of a computer, and the *second part* consists of 2 data analysis exercises to be completed using R/RStudio on the online exam platform.
- Students and the instructor may request an optional oral exam covering the entire program.
- The use of texts or any other materials is not permitted during the exam, except for the codes provided by the instructor at the beginning of the exam.
- The use of mobile phones or any digital support is not allowed during the exam.
- The evaluation of the two parts of the Exploratory Analysis exam is proportional to the credits allocated during the course to the theoretical and computational parts.

Textbooks and Reading Materials

- Lecture notes from the instructor
- Johnson, Wichern (2014) Applied Multivariate Statistical Analysis (6th Edition), Pearson Prentice Hall
- Everitt, Hothorn (2011) An Introduction to Applied Multivariate Analysis with R, Springer

Semester

The course is scheduled in the first part of the second semester.

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION