UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistical Models and Bayesian Inference

2425-2-F8203B042

Learning objectives

The course is structured into two modules that fall within the fields of statistical sciences, computer science, and social sciences, with the shared goal of providing students with both theoretical knowledge and practical skills for advanced statistical analysis, with particular attention to the reproducibility and replicability of analyses and the effective communication of results.
The first module introduces students to classical inferential approaches, including bootstrap methods, generalized linear models, mixture models, and predictive models. The teaching activities involve the use of R software within the RMarkdown environment to carry out statistical analyses on real and simulated data, enabling students to develop autonomy in statistical reasoning, problem-solving skills, and written communication competencies.
The second module focuses on the Bayesian approach to statistical inference, integrating it with the classical methods presented in the first module. Students are introduced to Bayesian models, computational methods (MCMC), and the use of software tools such as R and SAS for model estimation and evaluation. This module also emphasizes reproducibility and the creation of integrated documents that clearly present code, analyses, and interpretation of results.
For a detailed description of the program, please refer to the syllabus published on the course webpage.
Overall, the course enables students to acquire a solid theoretical foundation and practical abilities to address statistical analysis problems in applied fields such as biostatistics, epidemiology, genetics, and public health. By the end of the course, thanks to the provided materials and the practice- and communication-oriented approach, students will be able to independently deepen their understanding of the subject and apply their knowledge in various professional contexts.

Contents

Detailed program

Prerequisites

Teaching methods

Assessment methods

Textbooks and Reading Materials

Semester

Teaching language

Sustainable Development Goals

NO POVERTY | GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION