UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Metodologie Quantitative

2526-1-F5112P006

Learning area

RESEARCH METHODS, TECHNIQUES AND INSTRUMENTS IN SOCIAL AND ECONOMIC PSYCHOLOGY

Learning objectives

Knowledge and understanding

- Psychological measurement
- Dimensional structure of empirical data
- Prediction of relevant variables
- Tests of theoretical models with multiple regressions and analysis of variance
- Basic notions of inferential statistics
- Basic notions of linear mixed model

Applying knowledge and understanding

- Verification of data dimensional structure through factor analysis
- Use of models of multiple regressions for prediction and for testing theoretical models
- Use of models of analysis of variance, in applied contexts
- Hypothesis testing

Making judgements

- Defining simple research questions (goal achieved through practical group activities)
- Choosing the correct analysis model to answer experimental questions (goal achieved through hands-on group activities)
- Critical interpretation of results of statistical analyses (goal achieved through interactive activities and

lectures)
- Critical understanding of scientific results reported in the literature (goal achieved through interactive activities and lectures)

Communication skills

- Clear and complete description of the analysis models used (objective achieved through interactive activities and lectures)
- Clear and transparent communication of the results obtained through statistical analysis (objective achieved through interactive activities and lectures)
- Explanation of the theoretical basis and goal of the techniques studied (goal achieved through group practice activities and lectures)

Learning skills

- In-depth study of the topics covered through suggested scientific articles
- Autonomous analysis of data through exercizes and provided databases

Contents

The course addresses quantitative methods, focusing on psychological measurement and relevant statistical analyses. Concerning data analyses, the course will focus on data dimensionality, with specific emphasis on factor analysis and its use to uncover underlying latent dimensions. Special attention will also be devoted to the issue of prediction, especially focusing on multiple regression and its use to deal with theoretical issues, such as mediation and moderation processes. Finally, the course will deal with some aspects of inferential statistics and specific focus will be placed on analysis of variance for hypothesis testing.

Detailed program

- Introduction to measurement
- Reliability and validity
- Inferential statistics for hypothesis testing
- Multiple Regression
- Mediation and moderation analysis
- Logistic regression
- Analysis of variance (ANOVA)
- Principal Component Analysis

Prerequisites

Basic descriptive statistics (measures of central tendency and dispersion) and inferential statistics, correlation, simple linear regression and t-test.
Students who lack these prerequisites should read the first two chapters of the manual. Furthermore, these concepts will be briefly introduced in class.

Teaching methods

24 2-hour lectures conducted in the delivery mode in the initial part and interactively in the subsequent part. The delivery mode is aimed at addressing the theoretical foundations of the statistical techniques in the program. The interactive mode is aimed at discussing data analysis and performing exercises.
1 8-hour laboratory activity conducted in the interactive mode.
All activities are conducted in presence.

Assessment methods

Written final test with multiple-choice questions and open-end questions including problems. The oral exam is optional.

- *Multiple-choice questions.* The first part of the written test includes multiple-choice questions that assess particularly the understanding of the theoretical models underlying psychometric measurement and statistical models underlying data analysis techniques.

- *Open-ended questions.* The second part of the written test include problems that require to apply the acquired notions for developing research projects and for interpreting the results of data-analyses.

- *Oral exam.* The possibility of an oral exam is offered to students who consider that the result of the written exam does not reflect their real competence. The oral exam will include both the discussion of the written exam and a discussion of the topics covered in class. During the oral exam, both theoretical knowledge and practical abilities related to data-analysis will be assessed.

There will be no midterm exams.

It will be possible to obtain 2 points to add to the grade for students interested in producing a group work (5/6 individuals) to be presented in the classroom. During teh first lecture, information will be provided regarding this possibility.

Textbooks and Reading Materials

The teaching material includes lecture slides and the textbook. I will also suggest scientific papers about specific topics. The lecture slides and the papers will be made available on the university's onilne platform.

Book: Gallucci M., Leone L., Berlingeri, E. (2017). *Modelli statistici per le scienze sociali, seconda edizione*. Milano: Pearson Educational.

Detailed information regarding other teaching material will be published in the course's e-learning page before the beginning of the lessons

Sustainable Development Goals

QUALITY EDUCATION