UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Psychometrics and Quantitative Methods

2122-1-F5105P003

Learning area

2**:** Research methods in experimental psychological sciences

Learning objectives

Knowledge and understanding

- Basics of measurement in psychology
- Psychological measures properties
- Basics of inferential statistics and hypothesis testing
- Statistics for prediction
- Statistics for comparing means
- Data dimensional structure

Applying knowledge and understanding

- Using and evaluating different types of psychological measures
- Understanding of basic logic of scientific empirical testing
- Ability to analyze data in a range of research designs
- Estimating and understanding simple and complex relationships among variables.

- Mastering of R/Jamovi software (laboratory)

Contents

The course is about psychometrics and quantitative methods. Fundamental concepts related to measurement in psychology and the logic of hypothesis testing will be presented. Concerning data analyses, the course will focus on statistical techniques for prediction (e.g., multiple regression), for comparing means (e.g., ANOVA), and for uncovering data dimensionality (e.g., Factor Analysis). Emphasis will be given on choosing the adequate statistical analysis and on interpreting the results. The associated laboratory will provide hands-on experience on the statistical software R and Jamovi.

Detailed program

- Introduction to psychological measurement
- Direct and indirect measures
- Reliability and validity
- Statistical models and inferential statistics
- Multiple Regression
- ANOVA and General Linear Model
- Principal Component Analysis

Laboratory

- Basic of R and Jamovi statistical software and hands-on exercises with data.

Prerequisites

Basic descriptive statistics (measures of central tendency and dispersion); Basic inferential statistics; Simple linear regression and correlation; t-test. Students lacking such basic knowledge are encouraged to ask for a list of basic references.

Teaching methods

Theoretical and practical classes. Practice sections in the computer labs with analyses of research data and

discussion.

*** Lessons will be held in presence, unless further COVID-19 related restrictions are imposed. ***

Assessment methods

The exam will verify the level of mastery of the course contents with special attention to:

- Understanding the logic of the statistical analyses discussed in the course;

- The ability to choose between different techniques based on the research design and aims;

- Ability to execute the analyses with suggested software;

- Ability to interpret and report the results of the statistical analyses discussed in the course.

The exam will consist of multiple-choice questions and open-ended questions on the course topics (with optional oral examination).

Textbooks and Reading Materials

Field, A. P., Miles, J., & Field, Z. (2012). Discovering statistics using R. London: Sage (selected chapters).

Additional readings will be indicated during the lectures.