UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Elements of Psychometrics With Software Lab 1 - 1

2425-1-E2401P131-T1

Learning area

Knowledge of qualitative and quantitative research methodology

Learning objectives

Knowledge and understanding

- Descriptive statistics
- Inferential statistics
- Univariate and bivariate statistical inference

Applying knowledge and understanding

- Using a statistical software for data analysis
- Ability to choose the most adequate data analysis technique for the context
- How to report results of statistical analyses in conformity to the prevailing standards in psychology (APA).

Contents

This course aims at providing the basic knowledge on descriptive and inferential statistics. Furthermore, it addresses some techniques of statistical analysis and introduces the use of the *jamovi* or of another statistical software

Detailed program

- Descriptive statistics: measurement scales, central tendency and variability indices, standardized measures;
- Graphical synthesis and graphical exploration of the data;
- Introduction to probability;
- Basic inferential statistics: sampling distribution, hypothesis testing, confidence intervals;
- Parametric techniques: t-test for the difference between means (single sample, independent samples, paired samples); linear correlation (Pearson's)
- Non-parametric techniques: Chi-squared test (equally-probable categories, independence, test of a model), correlation (Spearman)
- Effect size and its use
- Introduction to the concept of power analysis

Prerequisites

As this is a compulsory first-year course, the only prerequisites are basic knowledge of mathematics/algebra and computer use. Possible specific lacunae will be handled during the lessons.

Teaching methods

Teaching with Different Didactic Methods:

- 21 lessons of 2 hours each, delivered in person (lecture based teaching), generally divided into logical blocks corresponding to the chapters of the textbook. The lessons will cover the theoretical aspects of the program. For some blocks, self-assessments or exercises might be provided on the e-learning platform;
- 18 hours of interactive exercises (interactive teaching), organized in sessions of 2 or 3 hours each, during which students will have the opportunity to practice the statistical techniques learned in class using one or more statistical software programs.

The teaching activities will take place in-person.

Assessment methods

The exam is written and consists of multiple-choice questions, open-ended questions, and statistical analysis exercises.
Additionally, by performing analyses on a data file assigned at the beginning of the exam, the competence in using the statistical software (or statistical softwares) learned will be assessed, as well as the ability to interpret the results obtained through the software.
A minimum score of 18/30 in the multiple choice part is required for the remaining parts to be assessed.

The questions are aimed at verifying the actual acquisition of theoretical knowledge, the ability to perform statistical analyses (with and without the aid of statistical software), and the interpretation of the results of these analyses.

There are no midterm or partial exams.

For students who request it (or at the instructor's request), an oral interview on all the topics of the course is also provided, which can lead to an increase or decrease of up to a maximum of 2 points on the written exam score.

Textbooks and Reading Materials

Official material:
1: Lecture slides
2: Exercise slides
3: Aron, A., Coups, E. J., & Aron, E. J., Cooley, E. (2024). Fondamenti di Psicometria per la ricerca. Milano: Pearson. (Specific instructions on the chapters to study will be provided through e-learning before the start of the course)

Below are some free resources (in English) available online (outside the official syllabus), which may still be useful for those wishing to further explore the use of jamovi:

1. jamovi website – open statistical software for the desktop and cloud (https://www.jamovi.org/)
2. LSJ Book (https://www.learnstatswithjamovi.com/)
3. jamovi video tutorial (https://datalab.cc/jamovi/)
4. Slide tutorial: Jamovi Tutorial (slideshare.net) (https://www.slideshare.net/THIYAGUSURI/jamovi-tutorial-free-and-open-source-statistical-software)

Sustainable Development Goals

QUALITY EDUCATION