UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Elements of Psychometrics With Software Lab 1 - 1

2324-1-E2401P131-T1

Learning area

Knowledge about qualitative and quantitative research methodology

Learning objectives

Knowledge and understanding

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

Applying knowledge and understanding

- Using SPSS (or another statistical software) for data analysis
- Ability to select the most appropriate data analysis technique in a given research context based on the number and level of measurement of variables, considering working hypotheses.
- Report the results obtained following the standard mainly used in psychology (APA style)

Contents

The course provides descriptive and inferential statistics basics and proposes some data analysis techniques. It also introduces the use of statistical software (SPSS or Jamovi).

Detailed program

- **Descriptive statistics**: measurement scales, central tendency, and variability indices, standardized measures;
- **Graphical synthesis and graphical exploration of the data**; effect size and its use
- **Introduction to probability**;
- Introduction to the concept of **power analysis**;
- **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)

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.
Any specific gaps will be resolved during the lessons (theoretical part) or the laboratories/exercises (practical part).
It is mandatory to pass the OFA (Offerta Formativa Aggiuntiva or Additional Educational Offer) in Mathematics to access the exam.

Teaching methods

Lectures will be in Italian split into blocks corresponding to the chapters of the coursebook. The statistical software will discuss within each block through exercises in class. Self-evaluation exercises may be available for some blocks (on the e-learning platform).

In parallel to the lectures, "software laboratories" will be available, during which students will use the statistical software(s) to enhance their learning.

Assessment methods

The exam is in written form and consists of exercises of statistical analysis, open questions and, multiple-choice questions. SPSS (or another statistical software) will be used with a data file provided at the beginning of the examination. The questions aim to ascertain the active acquisition of the theoretical knowledge and of the ability to execute statistical analyses (with and without statistical software) and understand the results.

There will be no mid-term assessments, but instead, there will be a simulation of the exam.

Interested students can also request an oral supplement, on all topics of the course. This oral integration can increase or decrease the mark of the written exam up to 2 thirtieths.

Textbooks and Reading Materials

For lessons (theory):

- Slides (in Italian)
- Aron, A., Coups, E. J., & Aron, E. J. (2018). *Fondamenti di statistica. Introduzione alla ricerca in psicologia.* Milano: Pearson. [capp. 1-8, part 9, 11, 13, part of 14]
- Erasmus students can use the English version of the textbook: Aron, A., Coups, E. J., & Aron, E. J. (2013). *Statistics for Psychology* 6th ed. Pearson [Chapters 1-8, 9 (partial), 11, 13, 14 (partial).

For the practical part, a text chosen from:

- Vanin, L. (2014). *SPSS pratico. Configurazioni, output e interpretazioni a colpo d'occhio*. Milano: Cortina.
- Barbaranelli, C., D'Olimpo, F. (2007). *Analisi dei dati con SPSS. Vol. I: Le analisi di base*. Milano: LED.
- Any book (in English) on SPSS (versions from 16 onwards) as long as it includes the course topics (available in the University Library).

Sustainable Development Goals