COURSE SYLLABUS

Research Methods II

2526-134R-2

Title

Research Methods II

Teacher(s)

Alessandra Decataldo

Language

English

Short description

The course introduces the procedures of descriptive and exploratory analysis of multivariate data, starting from the construction and validation of the data matrix. Preliminary analyses (univariate, bivariate, and trivariate) will be discussed, and factorial, classification, and multidimensional scaling techniques will be introduced, with the goal of summarizing and exploring complex data sets.

Detailed Description
The course is organized around three key stages:

1. Preparation and validation of the data matrix, with strategies for preliminary analysis (univariate, bivariate, and trivariate).
2. Analysis of relationships among variables, through factorial techniques and latent variable models.
3. Analysis of relationships among cases, using classification approaches and spatial representations (multidimensional scaling).
   The lectures combine theoretical foundations with practical examples using statistical software, aimed at developing both applied and interpretative skills.

Course Index and Schedule

Lecture 1 – The Data Matrix and Preliminary Analyses
Topics Covered:
• Construction of the data matrix: definition of variables and cases.
• Validation strategies: missing data, outliers, redundancies.
• Standardization and scaling.
• Univariate analysis: distributions, measures of central tendency and variability.
• Bivariate analysis: contingency tables, associations, correlations.
• Trivariate analysis: control logics and complex relationships.

Lecture 2 – Analysis of Relationships among Variables
Topics Covered:
• Principal Component Analysis (PCA).
• Introduction to Exploratory Factor Analysis (EFA).

Lecture 3 – Analysis of Relationships among Cases and Representation Techniques
Topics Covered:
• Logic of homogeneous groupings.
• Hierarchical and non-hierarchical Cluster Analysis.
• Similarity/distance measures and criteria for determining the number of clusters.
• Introduction to Multidimensional Scaling (MDS): logic and applications.

CFU / Hours

12 hours

Teaching period

from January 20 to February 3 2026

Sustainable Development Goals

QUALITY EDUCATION