

# Data exploration and description in psychology

## Brief description of course content (According to the programme's verification report)

**Descriptors:** Data exploration and description, Probabilistic Models of Psychological Processes, Sampling, Inference and Generalization.

**Contents:** Introduction to the Theory of Measurement. Data as the results of a measurement in Psychology. Types of Data. Description and exploration of a data set. Multivariate description of a data set. Introduction to probabilistic models: discrete and continuous models. Sampling in research planning. Generalization and Inference. The problem of estimating parameters in research data analysis.

## Learning outcomes

- To understand the types of psychological variables and measurement scales.
- To understand the description and exploration of a data set.
- To understand basic sampling principles.
- To understand some basic concepts of Statistical Inference.

## Planned learning activities

### Theory Syllabus

- **Topic 1.** Measurement in Psychology. Research in Psychology. Psychological variables and their measurements. Measurement scales. Properties of measurement scales. Descriptive and inferential statistics.
- **Topic 2.** Codification, organisation and graphic representation of data. Basic concepts: constant, variable, modalities, frequency, proportion, percentage. Methodological classification of data. Classification according to the data measurement level. Statistical data classification. Information organisation. Codification and preparation for analysis. Graphic representation of the variables.
- **Topic 3.** Univariate description and exploration. Data exploration. Position statistics. Properties. Concept of dispersion. Importance of the study of variability in research. Dispersion indices. Graphic representation of variability. Form statistics. Types of scoring.
- **Topic 4.** Bivariate or multivariate data description. Two-dimensional graphs and distribution. Association between variables. Correlation. Regression analysis.
- **Topic 5.** Introduction to probability calculus. Random phenomena. Operations with events. Concept of probability. Interpretation of probability. Conditional probability. Bayes' Theorem
- **Topic 6.** Probability models. Random variables. Discrete random variable. Types and characteristics of discrete probability models. Continuous random variable. Types and characteristics of continuous probability models. Normal model. Chi-squared distribution. T-student distribution. Fisher-Snedecor F distribution. Approximation between probability models. Introduction to sampling and statistical inference.

## Practical Syllabus

- **Practical exercise 1.** Data collection. Creating a database. Codification according to the types of data. Preparing the data for analysis.
- **Practical exercise 2.** Frequency distribution. Graphic representations.
- **Practical exercise 3.** Univariate descriptive statistics. Stem and leaf diagram. Box-plot graphs.
- **Practical exercise 4.** Bivariate description. Descriptive indices of two variables. Correlation analysis. Linear regression analysis.
- **Practical exercise 5.** Probability. Frequentist interpretation. Law of frequency stability. Objective and subjective probabilities. Conditional probabilities.
- **Practical exercise 6.** Discrete random variables. Practical calculation of probabilities in discrete models. Distribution moments. Distribution simulation. Continuous random variables. Practical calculation of probabilities in continuous models.
- **Project:** Data from a wide sample of people from a set of questions about a topic chosen by the student will be collected, and a descriptive report will be made with this data.