## COURSE UNIT INFORMATION SHEET (SYLLABUS)

### 2019/2020

<table>
<thead>
<tr>
<th>Name</th>
<th>MULTIVARIATE DATA ANALYSIS</th>
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<tbody>
<tr>
<td><strong>Teaching staff</strong></td>
<td>Ana Sousa Ferreira</td>
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<tr>
<td><strong>ECTS</strong></td>
<td>6 ECTS</td>
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<tr>
<td><strong>Functioning</strong></td>
<td>Theoretical - Practical Classes.</td>
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### Learning goals

Expand and improve the expertise to investigate in the field of Psychology, equipping students with more methodological knowledge and introducing exploratory multivariate data analysis methods that enable the development of research projects and data analysis in this area.

### Skills to develop

- Understand and recognize the specificities of research in psychology and types of research most widely used in the area;
- Know how to analyze interrelationship between different kinds of variables;
- Know how to use statistical language clearly and correctly;
- Understand the exploratory multivariate data analysis in reading scientific articles;
- Choosing suitably between different data analysis techniques, according to the nature of the data and their assumptions;
- Know efficiently using computers and statistical software, enabling support to communication skills, collecting and analyzing information.

### Prerequisites (precedences) *

Frequency and approval in the courses “Introdução às Probabilidades e Estatística Aplicadas à
Psicologia” and “Estatística Aplicada à Psicologia” is advisable.

Contents

- Review and introduction of new concepts of Univariate and Bivariate Exploratory Data Analysis using the software IBM SPSS Statistics 25.
- Introduction to new softwares like R, FACTOR, ...
- Principal Components Analysis (PCA): Introduction; PCA on covariate matrix and PCA on correlation matrix; Criteria for determining de appropriate number of principal components; How to obtain and interpret results.
- Introduction to Exploratory Factor Analysis (EFA) and its relationship with Principal Component Analysis. Criteria for determining de appropriate number of factors; Rotation methods; How to obtain and interpret results.
- Other types of Factor Analysis: Factor analysis on Spearman correlations; Factor analysis on polychoric correlations.
- Factor Correspondence Analysis: Introduction; contingency tables and Burt tables; Determination of the factors; How to obtain and interpret results.
- Cluster Analysis: Introduction; Hierarchical and not hierarchical methods Similarity and dissimilarity measures; Linkage measures; Dendrograms.
- Brief Introduction to Multidimensional Scaling (MDS).

Bibliography


Teaching methods

Guiding by the principle of "learning by doing”, this course focuses on theoretical and practical classes: Will be used several strategies and activities, using masterly exposition, exposition through dialogue, group work and discussion, resolution of problems and data analysis (making use of
statistical software) and critical reviews of data applications with different kinds of techniques.

**Evaluation Regimes** (General and/or Alternative):

Completing successfully the course is conditional upon success in two mandatory evaluation elements:

1. **Group assessment element:**
   
   Group work done by 3/4 students consisting of a practical work of data analysis with presentation in class (about 20m) and delivery of a written report.

2. **Individual evaluation element:**
   
   Two Quizzes of continuous evaluation, carried out in class, around 120 minutes.
   
   If the students do not get a grade point average of 9.5 in the two quizzes (and in each quiz scoring 9 or more) will have to present to the final exam, also with a minimum final grade of 9.5.

**Evaluation Elements** (Dates due, weights, minimum required grades)

Approval in the course is subject to successful completion (minimum score of 9.5) of two elements of assessment, one individual element and the other an evaluation group element. The individual assessment element has a weight of 65% of the final grade and students are obliged to obtain a point grade greater than or equal to 9.5. The group evaluation element has a weight of 35% of the final grade and students must have a point grade greater than or equal to 9.5.

If the students succeed in the quizzes they are exempt from the final exam. The ratings in the group evaluation element can be saved for the next school year. The classification on individual assessment element is only valid during the school year.

The date of the exam depends on the timing of exams of FPUL. The dates of the quizzes and the delivery of the group work will be opportunely combined with students during the semester.

**Rules for grade improvement**

Grade improvements follow the general rules of the FPUL.

**Rules for students having previously failed the course unit** *

Students having previously failed the course unit who performed a successful group work during the previous school year can keep the grade obtained if they wish.

**Requirements on attendance and punctuality**

This course is a classroom-based course, demanding punctuality and requires the attendance of at least two-thirds of the lessons.
## Rules for special students

Maximum number of absences allowed in order to completion the final assessment: a third of the total number of classes.

## Language of instruction

Portuguese but English reading domain is necessary.

## Disciplinary violations and penalties

According to the Evaluation of Learning Regulation of the Faculty of Psychology of the University of Lisbon, the following behaviors are considered as disciplinary offenses subject to disciplinary action:

- a) To use or attempt to use materials, information, notes, study resources or other objects and equipment not authorized in academic exercises;
- b) To help or try to help a colleague in committing a disciplinary offense;
- c) To submit the same written work for evaluation in different course units without permission from the instructors, even if with minor changes;
- d) To present someone else’s work as one’s own;
- e) To forge, or change without permission from the author, any information or citation in an academic work;
- f) To interfere, change or attempt to change grades;
- g) To try to prevent or interfere with the proper functioning of classes, research or other academic activities;
- h) To make false accusations regarding instructors, governance bodies, other students or non-teaching staff of the FPUL;
- i) To falsify signatures in attendance sheets, documents relating to evaluation elements or in any official document relating to an academic process or status.

Disciplinary offenses committed in any assessment element can lead to its annulment, and must be reported to the Pedagogical Council or, considering their gravity and repetition, may lead to other penalties, to be determined by the Rector of the University of Lisbon.

*If applicable*